

AUTOMOTIVE INDUSTRIES

Today's Cars are Longer Lived

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LIFE expectancy for passenger cars has increased from 7.04 years in 1924 to 8.58 years in 1938. During the same period of time the average age of cars in use has climbed from 3.07 years to 4.54 years. These changes may be attributed to several factors such as improved construction of passenger cars both in materials and design, better lubricating oils and greases, tires that add greatly to the riding qualities of the cars and thus relieve strains and stresses formerly experienced, and the great progress that has been made in our highway construction. However, in our opinion, the greatest single factor responsible for the increase in the life expectancy has been the general economic conditions throughout the country during the past eight years. The number of yearly trade-ins has materially decreased and the passenger car owner has been forced to realize that there are many more years of life in a car than prior to the depression period.

*The Penn Mutual Life Insurance Company.

In 1926, Prof. C. E. Griffin of the University of Michigan conducted a thorough and comprehensive survey of motor vehicle registrations in order to determine the life expectancy of motor vehicles of various

ages, or, in other words, the rate at which automobiles are eliminated from use. The major result of his survey was a Generalized Life Table for Motor Vehicles, shown in the Chart below. While many attempts have been made to use this Life Table or modifications of it up through recent years, during the past four or five years the resultant estimates produced by its use were far from satisfactory and failed to apply to existing conditions. For this reason it was felt advisable to conduct a new survey of registrations in order to find out just what changes had occurred over the past 10 or 12 years.

In all of our work on this survey of registrations we have attempted to follow as closely as possible the method of procedure used by Professor Griffin. However, some deviations have been necessary due to changes in basic data. While he confined his study to the registrations of the State of Michigan alone, we felt it advisable to secure a larger sample which would be more representative of different areas of the country. We, therefore, took as our

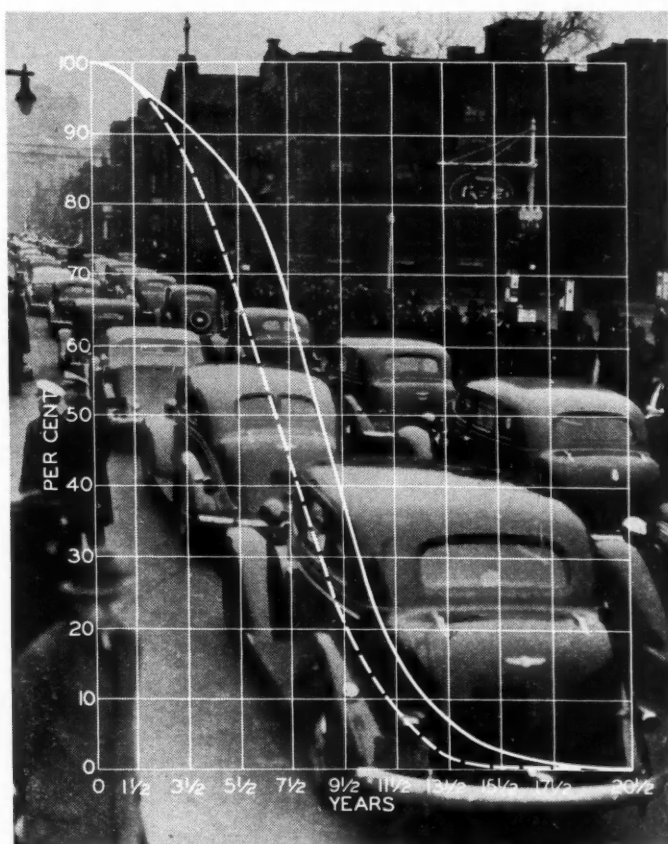


Chart showing the generalized life curve of automobiles as plotted on the dotted line by Professor C. E. Griffin for 1924 and the solid line plotted from 1938 data compiled by the authors

sample the passenger car registrations for the States of New York, Ohio and Kansas, which represented a total registration of over 4,000,000 passenger cars as compared with about 868,000 motor vehicles for the Michigan study. These car registrations were furnished us through the courtesy of the Motor Statistical Department of R. L. Polk & Co., who compile monthly new car and truck registrations and a yearly count of total registrations by makes of car or truck and their year of manufacture. Without this cooperation of R. L. Polk & Co., this survey could not have been made.

From these data of the 1937 and 1936 registrations it was found that the cars in the registrations of these two years were composed of cars of different years of manufacture. This breakdown is shown as follows:

Table 1

Year of Manufacture (1)	Number in 1937 Registrations (2)	Number in 1936 Registrations (3)	Number Eliminated (3 minus 2) (4)	Specific Death Rate in Per Cent (4 ÷ 2) (5)
1935.....	391,954	407,114	15,160	3.7
1934.....	319,178	328,372	9,194	2.8
1933.....	274,296	284,944	10,648	3.7
1932.....	220,950	228,052	7,102	3.1
1931.....	344,601	361,011	16,410	4.5
1930.....	389,942	422,318	32,376	7.7
1929.....	512,081	597,239	85,158	14.3
1928.....	275,346	362,822	87,476	24.1

Assuming 1936 cars to be $\frac{1}{2}$ year old at the time of the 1937 registrations, it is a simple matter of arithmetic to construct a Life Curve or rate of elimination curve from the specific death rate shown in Table 1, above. Due to lack of data for cars over $8\frac{1}{2}$ years of age, it was necessary to refer to Professor Griffin's death rate and to obtain empirical figures, following in general

the trend of his results, but modified to take into account the improved rates as shown by the preceding years. This Life Curve follows a clearly defined course. It has certain irregularities, however, which are to be expected in any statistical array. We have, therefore, smoothed out the curve, which is justifiable, not only to eliminate minor errors which might have occurred, but also because we desired, for practical purposes, a generalized curve applicable to the entire country rather than to just the three states involved.

Professor Griffin smoothed his curve by Makeham's Law which is the same mathematical law that has been found useful to describe the life curve of human beings. However, difficulty has been experienced in attempting to apply this law to present day mortality, and the same trouble was experienced in our present study. Accordingly we smoothed the curve graphically and present the resultant Generalized Life Table for Passenger Cars as shown below and also in the chart on page 201.

Table 2—Generalized Life Table for Passenger Cars

Age in Years	Number Living at First of Year	Age in Years	Number Living at First of Year
0	100,000	10 $\frac{1}{2}$	25,000
$\frac{1}{2}$	99,000	11 $\frac{1}{2}$	16,300
1 $\frac{1}{2}$	97,100	12 $\frac{1}{2}$	10,600
2 $\frac{1}{2}$	94,800	13 $\frac{1}{2}$	6,800
3 $\frac{1}{2}$	91,800	14 $\frac{1}{2}$	4,400
4 $\frac{1}{2}$	88,000	15 $\frac{1}{2}$	2,800
5 $\frac{1}{2}$	83,400	16 $\frac{1}{2}$	1,800
6 $\frac{1}{2}$	77,000	17 $\frac{1}{2}$	1,200
7 $\frac{1}{2}$	66,000	18 $\frac{1}{2}$	800
8 $\frac{1}{2}$	52,200	19 $\frac{1}{2}$	500
9 $\frac{1}{2}$	37,800	20 $\frac{1}{2}$	300

Having established the Generalized Life Curve for passenger cars it was then desirable to apply it to practical uses as pertaining to present day registrations. Total passenger

Table 3—Estimated Cars in Use by Year of Manufacture

Year of Manufacture	New Registrations for Model Years	Per Cent Surviving at End of Model Year	Number Surviving at End of Model Year
1938.....	1,839,285	100.0	1,839,285
1937.....	3,658,525	99.0	3,621,940
1936.....	3,312,090	97.1	3,216,039
1935.....	2,286,452	94.8	2,167,556
1934.....	1,888,557	91.8	1,733,695
1933.....	1,493,794	88.0	1,314,539
1932.....	1,096,399	83.4	914,397
1931.....	1,908,141	77.0	1,469,269
1930.....	2,625,979	66.0	1,733,146
1929.....	3,880,206	52.2	2,025,467
1928.....	3,139,579	37.8	1,186,761
1927.....	2,623,538	25.0	655,884
1926.....	3,228,401	16.3	526,229
1925.....	3,870,744	10.6	410,299
*1924.....	3,303,646	6.8	224,648
*1923.....	3,753,945	4.4	165,173
*1922.....	2,417,104	2.8	67,679
*1921.....	1,555,468	1.8	27,998
*1920.....	2,050,238	1.2	24,603
*1919.....	1,850,865	0.8	14,807
*1918.....	1,123,442	0.5	5,617
*1917.....	1,793,714	0.3	5,381

Total Surviving as of October 31, 1938..... 23,350,152

*—U. S. Production less U. S. Exports.

†—From Nov. 1 to Oct. 31, the model year.

‡—Ten Months or 1935 Model Year.

car registrations are composed of cars that go into service each year throughout the United States. These registrations are naturally made up of new and used cars but for an analysis of these registrations it is necessary to use a count of the new cars that have gone into service each year for a period of 20 years. The only official count of such cars is that furnished by R. L. Polk & Co., which goes back to 1926. Prior to that time we had to rely on United States production of passenger cars less United States exports. We have based our calculations on the Model Years rather than the Calendar Years.

By the use of this Generalized Life Curve it is a simple matter to calculate the number of cars remaining in use of each model year of manufacture as shown above in Table 3.

(Turn to page 275, please)

Estimated Cars in Use by Make and Year of Manufacture

(As of Oct. 31, 1938)

	1938†	1937†	1936†	1935‡	1934	1933	1932	1931	1930	1929	1928 and Older Cars
Auburn-Cord.....		1,538	2,157	4,579	5,082	4,433	9,713	22,743	7,438	9,318	9,018
Buick.....	162,357	207,082	143,616	59,470	57,896	38,552	41,456	69,972	80,953	89,944	220,942
Cadillac.....	9,240	12,204	11,262	4,273	4,497	3,435	5,228	8,575	7,971	7,796	21,517
Chevrolet.....	465,771	798,208	881,443	507,686	491,044	417,554	269,265	449,240	408,463	407,166	634,062
Chrysler-Maxwell.....	47,750	90,664	49,576	33,991	25,752	25,236	21,698	40,540	40,199	44,118	135,695
De Soto.....	36,357	73,662	38,531	21,987	10,508	18,709	21,109	21,891	23,276	31,118	5,491
Dodge.....	102,423	269,166	232,220	138,307	82,747	75,734	23,444	40,879	42,309	60,433	174,034
Durant.....							946	5,566	14,150	24,907	60,371
Ford.....	344,472	801,528	746,374	678,149	487,025	273,779	215,945	407,007	696,364	683,890	899,894
Franklin.....					330	1,170	1,525	2,988	4,938	5,587	8,327
Graham-G. Paige.....	4,785	15,010	15,277	13,398	11,830	8,913	10,723	14,791	19,892	31,574	33,529
Hudson.....	40,751	12,768	21,000	16,513	17,724	2,592	7,206	14,775	20,107	32,725	63,138
Hupmobile.....	1,025	316	2,308	6,263	6,027	5,919	9,002	13,419	16,043	23,144	44,979
La Salle.....	14,567	29,642	11,372	9,085	4,757	3,264	3,209	5,300	7,433	10,591	9,832
Lincoln and L. Zephyr.....	17,069	25,310	12,405	1,325	1,892	1,858	2,651	2,669	2,875	3,211	7,055
Nash-La Fayette.....	33,556	70,911	35,791	28,335	21,679	9,991	16,874	30,312	37,717	54,886	107,705
Oldsmobile.....	87,144	190,352	176,467	115,473	65,798	31,060	20,123	36,177	33,337	48,798	58,802
Packard.....	50,905	98,147	61,108	27,492	6,015	7,991	9,222	12,517	18,690	23,299	34,691
Pierce-Arrow.....	25	255	815	685	1,597	1,894	2,245	3,482	4,465	4,377	5,544
Plymouth.....	268,628	496,972	459,311	303,486	277,747	219,707	93,346	72,602	42,439	44,254	11,083
Pontiac-Oakland.....	95,546	219,399	157,292	111,581	66,688	75,106	39,970	66,322	59,424	99,234	148,904
Reo.....			3,363	3,197	3,538	3,188	3,227	5,207	7,557	9,040	19,177
Studebaker.....	39,737	73,903	59,714	31,859	38,152	19,085	20,852	35,830	37,307	43,242	113,096
Terraplane-Essex.....		83,973	72,720	41,559	37,188	31,531	24,000	32,760	41,803	99,875	156,475
Willys-Overland.....	15,643	48,154	12,576	7,800	6,037	13,787	21,600	39,532	43,405	104,248	195,103
Total, These Makes.....	1,837,651	3,619,164	3,206,698	2,166,493	1,731,550	1,294,488	894,579	1,455,096	1,718,575	1,996,875	3,178,524

† Model years from Nov. 1 to Oct. 31.

‡ Ten months or 1935 model year.

U. S. and WORLD PRODUCTION

World Motor Vehicle Production by Countries—By Years

	1930	1931	1932	1933	1934	1935	1936	1937	1938†
United States	3,555,986	2,389,738	1,370,678	1,920,057	2,753,111	3,946,934	4,454,115	4,808,974	2,489,635
Canada	154,192	86,261	60,816	65,852	116,852	172,877	162,159	207,463	166,142
Total	3,510,178	2,472,359	1,431,494	1,985,909	2,869,963	4,119,811	4,616,274	5,016,437	2,655,777
Austria	3,200	4,100	2,364	1,575	1,355	2,509	5,275	6,043	*
Belgium	4,700	3,200	2,225	1,400	740	753	534	2,383	**
Czechoslovakia	16,840	16,980	13,580	10,000	10,000	9,978	12,141	13,813	13,000
Denmark	230	193	148	140	182	148	250	250	250
France	230,700	196,860	170,955	191,929	201,644	179,270	201,737	201,934	220,343
Germany	70,044	77,225	50,417	105,832	173,014	242,934	297,512	331,894	328,000
Hungary	841	237	121	143	222	111	465	615	500
Italy	42,685	29,280	29,100	42,000	43,416	45,208	43,600	66,000	70,388
Japan	371	531	675	1,808	2,845	6,800	9,632	14,430	30,000
Poland	288	200	175	780	800	788	2,400	2,200	7,600
Soviet Russia	7,972	20,500	26,849	49,675	72,466	97,000	138,400	199,123	215,000
Spain	450	250	435	375	830	591	.....	.....	.....
Sweden	2,400	2,444	2,995	2,975	3,122	3,404	4,451	6,626	8,335
Switzerland	1,000	1,070	996	480	436	460	296	700	**
United Kingdom	234,571	233,219	244,434	280,526	347,856	416,915	466,335	490,366	447,561
Total (Foreign)	616,292	576,289	545,469	689,638	858,928	1,006,869	1,183,028	1,336,377	1,340,977
World Total	4,126,470	3,048,648	1,976,963	2,675,547	3,728,891	5,126,680	5,799,302	6,352,814	3,996,754

* Included with Germany. ** Included with miscellaneous totaling about 2,700.

† The American Automobile (Overseas Edition), all other years Automotive Division, Bureau of Foreign and Domestic Commerce.

Wholesale Values of Production

(U. S. and Canada)

Year	Passenger Cars Units* Value	Trucks Units† Value	Cars and Trucks Units Value
1912	356,000 \$335,000,000	22,000 \$43,000,000	378,000 \$378,000,000
1913	461,590 399,902,000	23,500 44,000,000	485,000 443,902,000
1914	543,679 413,859,000	25,375 45,096,464	569,054 458,955,464
1915	895,930 575,978,000	74,000 125,900,000	969,930 701,778,000
1916	1,525,578 921,378,000	92,130 161,000,000	1,617,708 1,082,378,000
1917	1,745,792 1,053,505,781	129,157 220,982,668	1,873,949 1,274,488,449
1918	943,436 801,937,925	227,250 434,166,982	1,170,686 1,236,104,907
1919	1,657,652 1,451,785,925	275,943 423,326,621	1,933,595 1,875,112,546
1920	1,905,560 1,809,170,963	321,789 423,249,410	2,227,349 2,232,420,373
1921	1,518,061 1,031,752,452	164,304 169,914,098	1,682,365 1,201,666,550
1922	2,369,089 1,561,740,645	277,140 231,282,063	2,646,229 1,793,022,708
1923	3,753,945 2,274,554,488	426,505 317,478,940	4,180,450 2,592,033,428
1924	3,303,646 2,040,706,519	434,140 326,705,496	3,737,786 2,367,413,015
1925	3,870,744 2,544,628,799	557,056 470,634,763	4,427,800 3,015,163,562
1926	3,948,843 2,746,064,722	556,818 468,752,769	4,505,661 3,214,817,491
1927	3,083,360 2,265,633,102	497,020 435,072,641	3,580,380 2,700,705,743
1928	4,012,158 2,703,753,500	588,983 459,045,380	4,601,141 3,162,798,880
1929	4,794,898 2,981,141,842	826,811 595,504,039	5,621,709 3,576,645,881
1930	2,910,187 1,720,652,104	599,991 405,949,915	3,510,178 2,126,602,019
1931	2,038,183 1,153,907,947	434,176 272,748,305	2,472,359 1,426,656,252
1932	1,186,209 650,781,297	245,285 142,284,003	1,431,494 793,065,300
1933	1,627,367 795,304,780	358,614 192,131,509	1,985,981 987,436,289
1934	2,270,566 1,204,376,351	599,397 332,913,985	2,869,963 1,537,290,336
1935	3,387,806 1,788,635,180	732,005 399,211,522	4,119,811 2,187,846,702
1936	3,797,897 2,092,460,475	818,377 481,961,420	4,616,274 2,574,421,895
1937	4,068,935 2,397,717,534	947,502 573,310,107	5,016,437 2,971,027,641
1938	2,126,066 1,290,607,105	529,711 335,815,586	2,655,777 1,626,422,691

* Includes Taxicabs.

† Includes Buses.

For Automotive Export
Data turn to page 248

Foreign Production by Years

These figures do not include American cars assembled in European plants.

1924	334,500
1925	460,678
1926	529,343
1927	578,201
1928	589,900
1929	650,000
1930	616,292
1931	576,289
1932	545,469
1933	689,638
1934	858,928
1935	1,006,869
1936	1,183,028
1937	1,336,377
1938*	†1,340,997

* The American Automobile (Overseas Edition).

† Partly Estimated.

Truck Production by Capacities

(U. S. and Canada)

Truck Tonnage	1932 Number %	1933 Number %	1934 Number %	1935 Number %	1936 Number %	1937 Number %	1938* Number %
¾ ton or less	79,127 32.3	98,926 27.6	172,089 28.6	249,957 34.1	316,208 38.6	395,157 41.7	208,071 39.2
1 ton and less than 1½	1,618 .6	893 .2	2,341 .4	2,259 .3	9,686 1.1	21,580 2.3	15,795 3.0
1½ ton and less than 2	144,113 58.8	228,238 63.7	376,475 62.9	420,597 57.5	423,503 52.0	441,156 46.6	252,383 47.7
2 ton and less than 2½	7,620 3.1	15,866 4.4	25,995 4.3	28,950 4.0	30,837 3.7	30,431 3.2	16,792 3.2
2½ ton and less than 3	6,006 2.4	7,728 2.2	11,136 1.9	10,465 1.4	12,309 1.5	18,971 2.0	9,486 1.8
3½ ton and less than 5	2,689 1.1	2,859 .8	4,752 .8	3,612 .5	4,621 .5	6,170 .6	4,757 .9
5 ton	1,407 .6	580 .2	1,219 .2	.....	.....	.....	.....
Over 5 ton and special types	2,705 1.1	3,356 .9	5,390 .9	16,165 2.2	21,413 2.6	34,037 3.6	22,417 4.2
Total	245,285 100.0	358,548 100.0	599,397 100.0	732,005 100.0	818,377 100.0	947,502 100.0	529,711 100.0

* Partly estimated

Passenger Car Production by Wholesale Price Classes

(U. S. and Canada)

	Number of Units								
	1930	1931	1932	1933	1934	1935	1936	1937	1938*
Under \$500	1,754,747	1,328,294	794,164	1,316,341	1,443,357	1,787,171	1,919,618	1,368,018	499,857
\$501-\$750	680,352	413,929	260,831	237,099	715,989	1,444,529	1,677,558	2,392,415	1,365,777
\$751-\$1,000	204,450	162,954	74,610	31,610	66,223	110,813	143,269	260,280	228,277
\$1,001-\$1,500	179,180	80,687	36,670	20,125	27,576	28,736	39,997	31,226	25,450
\$1,501-\$2,000	55,351	33,846	8,699	10,409	8,391	8,716	11,545	11,633	3,661
\$2,001-\$3,000	27,266	12,714	8,679	8,725	6,879	5,413	4,326	4,061	2,152
\$3,001 and over	8,841	5,759	2,532	2,052	2,151	2,428	1,584	1,302	892
Total	2,910,187	2,038,183	1,186,185	1,627,361	2,270,566	3,387,806	3,797,897	4,068,935	2,126,066

	Percentage of Total								
	1930	1931	1932	1933	1934	1935	1936	1937	1938
Under \$500	60.30	65.17	66.95	80.89	63.57	52.75	50.55	33.62	23.51
\$501-\$750	23.38	20.31	22.00	14.57	31.53	42.64	44.17	58.80	64.24
\$751-\$1,000	7.02	8.00	6.29	2.00	2.92	3.27	3.77	6.40	10.74
\$1,001-\$1,500	6.16	3.96	3.09	1.24	1.21	.85	1.05	.77	1.20
\$1,501-\$2,000	1.90	1.66	.73	.64	.37	.26	.30	.28	.17
\$2,001-\$3,000	.94	.62	.73	.54	.31	.16	.11	.10	.10
\$3,001 and over	.30	.28	.21	.12	.09	.07	.05	.03	.04
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

* Partly estimated.

Monthly Motor Vehicle Production

(U. S. and Canada)

Passenger Cars

	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	
January	212,244	364,773	242,672	142,869	101,915	112,754	117,700	235,806	308,589	324,191	168,890	January
February	301,320	431,755	293,036	187,948	98,604	93,153	193,875	267,142	234,672	310,961	151,133	February
March	386,510	546,489	348,087	241,727	106,003	103,396	291,546	377,374	357,068	423,006	188,341	March
April	384,778	571,956	393,804	300,960	126,597	156,712	303,806	407,721	436,576	452,907	190,111	April
May	404,444	541,310	382,619	282,986	165,025	186,675	290,268	322,485	401,139	443,412	168,589	May
June	381,026	469,280	298,130	215,979	166,646	213,602	272,090	306,300	388,183	429,333	147,545	June
July	357,682	439,598	230,761	187,324	101,478	193,587	231,501	283,715	379,823	372,913	112,114	July
August	422,996	452,857	190,864	158,851	70,073	166,333	190,825	186,133	212,140	317,270	81,687	August
September	374,276	375,046	182,049	111,336	66,489	161,734	129,251	59,499	92,324	129,597	69,449	September
October	351,899	328,305	117,014	59,176	37,468	107,593	86,128	220,113	194,690	306,040	192,806	October
November	223,896	176,629	104,668	49,996	49,201	43,868	50,072	347,830	351,171	309,121	335,767	November
December	211,067	96,920	126,483	99,921	87,710	52,954	113,504	353,688	441,322	259,184	341,524	December
Total	4,012,158	4,794,898	2,910,187	2,038,183	1,186,209	1,627,361	2,270,566	3,387,806	3,797,897	4,068,935	2,126,066	Total

Motor Trucks

	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	
January	27,947	57,765	40,938	35,475	21,160	19,429	44,870	64,529	68,655	74,995	58,262	January
February	34,980	65,950	52,925	41,863	24,291	15,592	44,952	63,204	65,938	72,939	51,464	February
March	44,273	79,587	69,031	47,671	21,274	18,508	61,068	70,520	81,876	96,016	52,256	March
April	49,537	91,855	74,477	53,138	28,539	27,975	67,532	89,338	91,049	100,324	48,018	April
May	56,281	84,940	62,080	47,805	27,491	35,132	60,348	59,324	79,379	96,965	41,575	May
June	44,169	98,164	51,466	41,496	23,572	43,448	48,292	65,705	81,165	91,820	41,857	June
July	59,630	76,703	44,960	35,386	15,137	39,310	44,546	61,582	71,383	83,996	38,336	July
August	69,547	59,985	43,296	32,890	15,319	42,601	53,890	58,942	63,794	87,802	35,259	August
September	62,231	54,683	46,557	31,876	20,003	35,874	46,335	33,229	47,496	55,033	20,174	September
October	63,921	66,235	41,929	22,406	14,157	30,772	49,643	60,203	35,359	31,939	22,380	October
November	45,013	50,368	37,493	20,118	12,560	19,106	35,107	60,720	54,628	67,508	54,638	November
December	32,454	26,582	34,640	24,052	21,782	30,601	42,814	64,629	77,636	88,165	65,492	December
Total	588,983	826,817	599,991	434,176	245,285	358,548	599,397	732,005	818,377	947,502	529,711	Total

Passenger Cars and Trucks

	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	
January	240,191	422,538	283,610	178,344	123,075	132,183	162,570	300,335	377,244	399,186	227,152	January
February	336,300	497,705	345,961	229,811	122,895	108,745	238,827	350,348	300,810	383,900	202,597	February
March	430,783	626,076	417,118	289,398	127,277	121,904	352,614	447,894	438,943	519,022	238,597	March
April	434,315	663,811	468,281	354,098	155,136	184,687	371,338	477,059	527,625	553,231	238,129	April
May	459,725	636,250	444,699	329,901	192,516	223,807	350,616	381,809	480,518	540,377	210,174	May
June	425,195	567,424	349,596	257,475	190,218	257,050	320,382	372,085	469,368	521,153	189,402	June
July	417,312	518,301	275,721	222,710	116,615	235,897	276,407	345,297	451,206	466,909	150,450	July
August	492,543	512,842	234,160	191,741	94,392	238,934	244,715	245,075	275,934	405,072	96,946	August
September	436,507	429,729	228,606	143,212	86,492	197,608	175,586	82,728	139,820	175,630	89,623	September
October	415,620	394,540	158,942	81,582	51,625	138,365	135,771	280,316	230,049	337,979	215,286	October
November	268,909	228,997	142,161	70,114	61,761	62,974	85,179	408,550	405,799	376,629	390,405	November
December	243,541	125,502	161,323	123,973	109,492	83,755	156,318	418,317	518,958	347,349	407,016	December
Total	4,601,141	5,621,715	3,510,178	2,472,359	1,431,494	1,985,909	2,869,963	4,119,811	4,616,274	5,016,437	2,655,777	Total

Figures from U. S. Census Bureau (includes overseas assemblies of motor vehicles of American make) and Dominion Bureau of Statistics.

February 25, 1939

Automotive Industries

Passenger Car Production by Cylinders

(U. S. and Canada)

	Per Cent Fours	Per Cent Sixes	Per Cent Eights	Per Cent Twelves and Sixteens	Total
1926	64.0	34.0	2.0	..	100.0
1927	49.7	47.1	3.2	..	100.0
1928	50.7	45.0	4.3	..	100.0
1929	40.7	54.3	5.0	..	100.0
1930	44.5	43.6	11.8	0.1	100.0
1931	33.3	52.0	14.5	0.2	100.0
1932	17.9	50.4	31.1	0.6	100.0
1933	3.2	61.8	34.7	0.3	100.0
1934	1.2	59.8	38.8	0.2	100.0
1935	0.5	59.5	39.4	0.2	100.0
1936	0.5	66.5	32.4	0.6	100.0
1937	1.7	63.8	33.7	0.8	100.0
1938	0.7	64.1	34.3	0.9	100.0

Average Wholesale Price of Passenger Cars and Trucks

(Based on Units and
Value of Production)

	Passenger Cars	Trucks
1921	\$720	\$1,035
1922	660	834
1923	607	745
1924	618	753
1925	656	843
1926	695	842
1927	735	875
1928	673	781
1929	622	720
1930	591	678
1931	566	629
1932	548	580
1933	489	536
1934	530	555
1935	528	545
1936	551	589
1937	589	605
1938	607	634

State Gasoline Taxes and Registration Fees

STATE	State Tax per Gallon (Cents)	State Gasoline Tax Receipts		Per Cent Change	State Registration Fees		Per Cent Change	Total State Tax Receipts from Gasoline and Registration Fees		State Taxes per Motor Vehicle	
		1938	1937		1938	1937		1938	1937	1938	1937
Alabama	6	\$13,448,000	\$13,295,000	+1.1	\$3,102,000	\$4,439,000	-30.0	\$16,550,000	\$17,734,000	\$56.98	\$59.08
Arizona	5	4,225,000	4,325,000	-2.3	1,150,000	1,143,000	+0.6	5,375,000	5,468,000	41.73	42.31
Arkansas	6½	10,013,000	9,877,000	+1.2	2,914,000	3,241,000	-10.0	12,927,000	13,118,000	58.38	56.08
California	3	46,811,000	46,614,000	+0.2	12,972,000	24,003,000	-46.0	59,783,000	70,617,000	24.04	28.43
Colorado	4	7,489,000	7,431,000	+0.7	2,352,000	2,603,000	-9.6	9,841,000	10,034,000	29.24	29.66
Connecticut	3	9,381,000	9,445,000	-0.7	6,441,000	6,691,000	-3.5	15,822,000	16,136,000	36.51	36.98
Delaware	4	2,200,000	2,031,000	+8.3	1,300,000	1,202,000	+8.2	3,500,000	3,233,000	54.43	50.83
District of Columbia	2	2,600,000	2,724,000	-4.5	1,782,000	878,000	+103.0	4,382,000	3,602,000	28.57	19.56
Florida	7	22,800,000	22,063,000	+3.5	6,109,000	6,196,000	-1.4	28,909,000	28,219,000	68.42	67.00
Georgia	6	19,630,000	19,550,000	+0.4	1,654,000	2,368,000	-30.1	21,284,000	21,918,000	48.77	49.53
Idaho	5	4,089,000	4,035,000	+1.2	2,766,000	2,498,000	+10.8	6,855,000	6,533,000	49.88	46.06
Illinois	3	36,483,000	35,836,000	+1.9	21,153,000	21,430,000	-1.4	57,636,000	57,266,000	32.19	32.22
Indiana	4	22,288,000	22,987,000	-3.0	9,719,000	9,827,000	-1.1	32,007,000	32,814,000	34.89	34.32
Iowa	3	13,344,000	13,023,000	+2.8	11,779,000	11,918,000	-1.4	25,123,000	24,941,000	33.81	33.58
Kansas	3	10,000,000	10,083,000	-0.8	4,400,000	4,537,000	-2.8	14,400,000	14,620,000	25.08	24.91
Kentucky	5	12,532,000	12,671,000	-1.0	5,000,000	5,125,000	-2.5	17,532,000	17,796,000	42.62	44.06
Louisiana	7	16,548,000	15,923,000	+4.0	4,500,000	4,710,000	-4.5	21,048,000	20,633,000	65.31	62.84
Maine	4	5,562,000	5,550,000	+0.2	3,800,000	3,865,000	-1.5	9,362,000	9,415,000	48.01	46.86
Maryland	4	9,929,000	9,857,000	+0.7	4,571,000	5,577,000	-18.0	14,500,000	15,434,000	36.71	40.24
Massachusetts	3	20,543,000	19,836,000	+3.7	6,804,000	6,875,000	-15.5	27,347,000	26,711,000	32.45	31.52
Michigan	3	27,679,000	29,425,000	-6.0	20,848,000	22,085,000	-5.4	48,527,000	51,510,000	34.44	34.13
Minnesota	4	17,839,000	15,293,000	+16.7	9,277,000	8,867,000	+4.8	27,116,000	24,160,000	33.01	29.38
Mississippi	6	11,000,000	10,222,000	+7.8	2,200,000	2,248,000	-2.1	13,200,000	12,470,000	61.11	55.52
Missouri	2	11,089,000	11,082,000	....	9,408,000	9,638,000	-2.4	20,497,000	20,720,000	24.40	24.78
Montana	5	4,428,000	4,581,000	-3.4	1,500,000	1,532,000	-2.0	5,928,000	6,113,000	34.60	35.15
Nebraska	5	12,000,000	10,925,000	+9.8	2,500,000	2,603,000	-3.8	14,500,000	13,528,000	35.45	32.59
Nevada	4	1,198,000	1,177,000	+1.8	275,000	282,000	-2.5	1,473,000	1,459,000	37.62	35.88
New Hampshire	4	3,374,000	3,286,000	+2.5	2,731,000	2,347,000	+16.1	6,105,000	5,633,000	50.35	45.32
New Jersey	3	21,700,000	21,565,000	+0.8	20,298,000	19,271,000	+5.2	41,998,000	40,836,000	42.00	41.06
New Mexico	5	4,043,000	4,003,000	+1.0	1,917,000	1,544,000	+24.0	5,960,000	5,547,000	49.60	45.57
New York	4	66,132,000	61,841,000	+7.0	46,619,000	52,901,000	-11.7	112,751,000	114,742,000	43.55	44.35
North Carolina	6	23,310,000	22,429,000	+4.0	7,487,000	8,855,000	-15.5	30,797,000	31,284,000	58.74	60.09
North Dakota	3	2,285,000	2,873,000	-20.5	1,524,000	1,581,000	-3.5	3,809,000	4,454,000	21.85	25.71
Ohio	4	48,664,000	46,538,000	+4.7	24,523,000	25,635,000	-4.4	73,187,000	72,173,000	44.09	38.46
Oklahoma	4	13,911,000	13,768,000	+1.1	6,514,000	5,584,000	+16.9	20,425,000	19,352,000	38.24	35.36
Oregon	5	9,838,000	9,799,000	+0.3	2,899,000	3,378,000	-14.1	12,737,000	13,177,000	35.64	36.56
Pennsylvania	4	51,918,000	55,711,000	-7.0	34,407,000	38,332,000	-10.3	86,325,000	94,043,000	43.05	46.67
Rhode Island	3	3,515,000	3,090,000	+13.9	2,778,000	2,790,000	-0.5	6,293,000	5,880,000	36.96	34.82
South Carolina	6	11,000,000	10,901,000	+1.0	1,286,000	1,690,000	-24.0	12,286,000	12,591,000	44.00	45.02
South Dakota	4	4,048,000	4,071,000	-0.6	1,570,000	1,650,000	-4.8	5,618,000	5,721,000	31.02	30.97
Tennessee	7	18,268,000	17,914,000	+2.0	3,776,000	4,233,000	-10.7	22,044,000	22,147,000	57.16	55.31
Texas	4	42,561,000	41,671,000	+2.0	19,731,000	19,684,000	+0.2	62,292,000	61,355,000	41.42	42.03
Utah	4	3,524,000	3,421,000	+3.0	1,013,000	1,049,000	-3.1	4,537,000	4,470,000	27.64	35.30
Vermont	4	2,529,000	2,323,000	+8.9	2,377,000	2,410,000	-1.4	4,906,000	4,733,000	56.13	54.14
Virginia	5	16,616,000	16,114,000	+3.1	6,027,000	6,153,000	-2.0	22,643,000	22,267,000	52.22	51.52
Washington	5	15,394,000	15,268,000	+1.0	2,874,000	4,402,000	-34.8	18,268,000	19,670,000	34.90	36.73
West Virginia	5	9,557,000	8,488,000	+12.7	4,699,000	6,162,000	-23.7	14,256,000	14,650,000	54.79	50.40
Wisconsin	4	19,253,000	19,537,000	-1.5	13,080,000	12,984,000	+0.9	32,333,000	32,521,000	38.63	37.78
Wyoming	4	2,461,000	2,498,000	-1.5	601,000	597,000	+0.8	3,062,000	3,095,000	37.78	37.83
Total		\$769,029,000	\$756,930,000	+1.5†	\$369,007,000	\$399,613,000	-7.5†	\$1,138,036,000	\$1,156,543,000	\$38.96†	\$38.34†

† Average.

NEW VEHICLE

New Passenger Car Registrations†

	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938
Auburn	17,850	11,270	29,536	11,646	5,038	5,536	5,163	1,848	146	700
Austin		4,354	2,941		3,675	1,057				
Buick	*172,307	*122,656	90,873	49,708	43,809	63,067	87,635	160,687	205,297	166,380
Cadillac	14,936	12,078	11,136	6,259	3,903	4,899	6,692	11,766	11,231	10,639
Chevrolet	780,011	618,884	583,429	322,860	474,493	534,906	656,698	930,250	768,040	464,337
Chrysler	84,518	60,908	52,650	26,016	28,677	28,052	40,536	58,698	91,622	46,184
Continental					3,310	953				
Cord	799	1,879	1,416	335				1,174	1,149	
De Soto	59,614	35,267	28,430	25,311	21,260	11,447	26,952	45,088	74,424	35,259
De Vaux			4,808	1,358						
Dodge	115,773	64,105	53,090	28,111	86,062	90,139	178,770	248,518	255,258	104,881
Durant	47,715	21,440	7,229	1,135						
Ford	1,310,135	1,055,097	528,581	258,927	311,113	530,528	826,519	748,554	765,933	363,688
Franklin	10,704	7,482	3,881	1,829	1,329	260				
Graham	61,487	30,140	19,209	12,858	10,128	12,987	15,965	16,439	13,984	4,139
Hudson	62,692	30,466	19,189	8,641	2,946	19,307	21,587	20,825	90,043	40,889
Hupmobile	44,337	24,307	17,427	10,794	6,726	6,566	7,450	1,556	403	1,020
La Fayette						9,301	17,445			
La Salle	20,290	11,262	6,883	3,848	3,709	5,182	11,775	13,992	26,909	15,732
Lincoln	6,151	4,356	3,466	3,179	2,112	2,061	2,370	15,567	25,243	16,991
Marmon	*22,323	*12,369	5,687	1,385	86					
Mercury										6,835
Nash	105,146	51,086	39,366	20,233	11,353	14,315	17,739	*43,070	70,571	31,814
Oakland	31,830	21,648	12,985							
Oldsmobile	*93,483	*50,510	*46,983	24,128	35,295	71,676	149,375	178,488	188,306	92,398
Packard	44,834	28,318	16,256	11,058	9,081	6,582	37,653	68,772	95,455	49,163
Pierce-Arrow	8,386	6,795	4,522	2,692	2,152	1,740	875	787	167	17
Plymouth	84,969	64,301	94,289	111,926	249,667	302,557	382,985	499,580	462,258	286,241
Pontiac	158,272	68,389	73,148	47,926	85,348	72,645	140,122	171,669	212,403	98,399
Reo	17,319	11,450	6,762	3,870	3,623	3,854	3,894	3,146		
Rockne			2	16,966	14,554					
Studebaker	82,839	56,526	46,533	25,002	21,688	41,560	39,573	67,835	70,048	41,504
Terraplane (Essex)	191,331	63,338	42,545	28,778	35,831	40,510	53,838	78,471		
Willys-Whippet	162,366	51,687	42,936	22,483	15,314	6,576	10,439	12,423	51,411	13,012
Willys-Knight	37,343	14,079	8,405	3,415	353					
Miscellaneous	31,646	9,532	3,548	3,732	1,159	324	1,858	5,294	1,441	799
Total	3,880,246	2,625,979	1,908,141	1,096,399	1,493,794	1,888,557	2,743,908	3,405,497	3,483,752	1,891,021

By Manufacturing Groups

Chrysler Corp.	344,874	224,581	228,459	191,384	385,696	432,195	629,243	851,884	883,572	472,565
Ford Motor Co.	1,316,286	1,059,453	532,047	262,106	313,225	532,589	828,889	764,121	791,176	387,514
General Motors	1,271,129	905,427	825,437	454,739	646,556	752,375	1,052,297	1,466,852	1,414,186	847,885
All Others	947,917	436,518	322,198	98,190	148,347	171,398	233,479	321,640	394,818	183,057

† Data from R. L. Polk & Co.

In Percentage of Total by Makes

	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938
Auburn	.46	.43	1.55	1.06	.34	.29	.19	.05		
Austin		.17	.15		.25	.06				*.04
Buick	4.44	4.67	4.76	4.53	2.93	3.34	3.19	4.72	5.89	8.80
Cadillac	.38	.46	.58	.57	.26	.26	.24	.35	.32	.56
Chevrolet	20.10	23.57	30.59	29.46	31.77	28.32	23.93	27.33	22.05	24.56
Chrysler	2.18	2.32	2.76	2.37	1.92	1.49	1.48	1.72	2.63	2.44
Continental					.22	.05				
Cord	.02	.07	.07	.03				.03	.03	
De Soto	1.54	1.34	1.49	2.31	1.42	.61	.98	1.32	2.14	1.86
De Vaux			.25	.12						
Dodge	2.98	2.44	2.78	2.56	5.76	4.77	6.52	7.30	7.33	5.55
Durant	1.23	.82	.38	.10						
Ford	33.76	40.18	27.70	23.62	20.83	28.09	30.12	21.99	21.99	19.24
Franklin	.28	.28	.20	.17	.09	.02				
Graham	1.56	1.15	1.01	1.17	.68	.68	.58	.48	.40	.22
Hudson	1.62	1.16	1.01	.79	.20	1.02	.79	.61	2.58	2.16
Hupmobile	1.14	.93	.91	.93	.45	.35	.27	.05	.01	.05
La Fayette					.49	.64				
La Salle	.52	.43	.36	.35	.25	.27	.43	.41	.83	.83
Lincoln	.16	.17	.18	.29	.14	.11	.09	.46	.72	.90
Marmon	.58	.47	.30	.12	.01					
Mercury										.36
Nash	2.71	1.95	2.06	1.85	.76	.76	.65	1.27	2.03	1.68
Oakland	.82	.82	.68							
Oldsmobile	2.41	1.92	2.46	2.20	2.36	3.80	5.44	5.25	5.41	4.99
Packard	1.15	1.08	.85	1.01	.61	.35	1.37	2.02	2.74	2.60
Pierce-Arrow	.22	.26	.24	.25	.14	.09	.03	.02		
Plymouth	2.19	2.45	4.94	10.21	18.71	16.02	13.96	14.68	13.27	15.14
Pontiac	4.08	2.60	3.83	4.37	5.71	3.85	5.11	5.04	6.10	5.20
Reo	.45	.44	.35	.35	.24	.20	.14	.09		
Rockne			1.55	.97						
Studebaker	2.13	2.15	2.44	2.28	1.45	2.20	1.44	1.99	2.01	2.19
Terraplane (Essex)	4.93	2.41	2.23	2.62	2.40	2.15	1.96	2.30		
Willys-Whippet	4.18	1.97	2.25	2.05	1.03	.35	.38	.36	1.47	.69
Willys-Knight	.96	.54	.44	.31	.02					
Miscellaneous	.82	.35	.20	.35	.08	.01	.07	.16	.05	.04
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

By Manufacturing Groups

Chrysler Corp.	8.89	8.55	11.97	17.45	25.82	22.89	22.93	25.02	25.36	24.99
Ford Motor Co.	33.92	40.34	27.88	23.91	20.97	28.20	30.21	22.44	22.71	20.49
General Motors	32.75	34.48	43.26	41.49	43.28	39.84	38.35	43.09	40.60	44.84
All Others	24.44	16.63	16.89	17.16	9.93	9.07	8.51	9.45	11.33	9.68

*1929-1930

Buick includes Marquette.
Marmon includes Roosevelt.
Oldsmobile includes Viking.

*1931

Oldsmobile includes Viking.

*1936

Nash includes La Fayette for 10 months.

*1937-1938

Terraplane included with Hudson.
Austin now Bantam.

REGISTRATIONS

New Truck Registrations†

	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938
Autocar	2,941	2,009	1,748	1,015	1,127	1,139	1,001	1,451	2,181	1,617
Brockway	4,533*	3,780*	1,685*	752	875	1,213	1,245	1,695	1,593	1,303
Chevrolet	160,892	118,253	99,600	60,784	99,880	157,507	167,129	204,344	183,674	119,479
Diamond T	3,590	2,888	2,483	2,250	4,139	5,440	6,454	8,750	8,110	4,393
Dodge	28,567	15,558	13,518	8,744	28,034	48,252	61,488	85,295	64,098	33,656
Federal	2,853	2,095	1,523	1,167	1,360	1,962	2,190	2,930	2,339	1,370
Ford	223,405	197,216	138,854	66,937	62,397	129,250	185,848	177,244	189,376	100,959
G. M. C.	14,248	9,004	6,919	6,359	6,602	10,449	11,442	26,980	43,522	20,152
Hudson							638	1,905	4,823	719
Indiana				957	1,252	729	862	1,705	1,371	435
International	31,434	23,703	21,073	15,752	26,658	31,555	53,471	71,958	76,174	55,836
Mack	6,823	4,943	2,945	1,425	1,652	1,830	1,515	4,226	5,513	4,406
Plymouth							660	2,420	13,709	6,652
Reo	12,894	6,427	5,166	3,187	3,042	5,035	5,101	4,227	4,254	2,929
Sterling	1,577	1,244	739	227	108	134	174	277	311	267
Stewart	2,163	2,315	1,394	867	684	736	880	1,280	1,148	390
Studebaker	1,661	1,518	3,495	2,430	2,407†	1,697	2,100	3,279	5,129	2,000
White	6,121	4,395	2,561	2,138	1,384	3,963	3,304	5,757	5,933	3,514
Willys	6,536	4,264	3,131	1,132	233	25	2,280	2,441	1,122	1,889
All Others	16,819	11,107	7,050	4,290	4,035	3,970	2,901	3,480	3,861	3,383
Total	527,057	410,699	313,884	180,413	245,869	403,886	510,683	611,644	618,249	365,349

* includes Indiana. † Includes Rockne. ‡ Data from R. L. Polk & Co.

U. S. Registrations of New Cars and Trucks*

U. S. New Passenger Car Registrations

	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	
January	136,071	219,760	180,094	126,776	87,493	79,821	61,242	136,635	215,775	280,685	145,765	January
February	165,537	235,590	211,645	134,133	82,813	69,464	94,887	170,615	176,651	215,049	120,359	February
March	254,214	377,802	298,824	200,841	92,192	78,741	173,287	261,477	301,239	363,738	181,222	March
April	332,056	481,675	357,064	265,732	121,093	119,909	223,050	319,650	397,186	384,951	192,241	April
May	351,459	454,132	345,031	247,727	131,282	160,242	219,225	293,199	392,744	391,697	178,052	May
June	317,069	386,398	260,861	201,911	148,752	174,190	223,864	280,380	369,422	360,236	156,384	June
July	324,120	432,503	254,098	194,322	104,188	185,660	229,006	285,178	357,490	365,767	148,896	July
August	329,674	376,886	203,737	155,744	93,457	178,661	193,198	233,851	262,912	306,958	127,954	August
September	271,621	304,452	175,286	124,903	81,893	157,976	146,931	157,098	208,896	235,683	93,289	September
October	284,939	288,697	150,219	102,659	63,195	136,326	140,937	149,389	171,397	202,898	119,053	October
November	211,736	183,756	93,066	75,829	44,358	94,180	107,574	220,262	223,732	196,463	200,853	November
December	180,883	138,555	96,054	77,564	45,683	58,624	75,356	237,194	327,053	179,621	226,973	December
Total	3,139,579	3,880,206	2,625,979	1,908,141	1,096,399	1,493,794	1,888,557	2,743,906	3,404,497	3,483,752	1,891,021	Total

U. S. New Truck Registrations

	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	
January	16,431	29,900	30,236	24,415	14,776	11,709	22,903	34,759	43,760	47,618	31,995	January
February	17,510	32,637	31,880	23,466	14,558	9,707	24,476	34,797	40,301	41,843	27,551	February
March	24,698	46,368	42,199	30,609	16,874	9,934	33,884	41,511	52,428	60,301	37,255	March
April	30,272	56,299	47,029	36,848	17,784	17,301	38,882	46,785	64,956	67,832	35,682	April
May	32,468	52,874	43,286	33,496	18,696	20,825	39,631	47,968	62,183	65,857	32,937	May
June	29,155	45,114	33,531	28,496	17,876	23,254	34,768	48,243	56,851	58,626	30,647	June
July	31,844	57,943	39,904	30,102	14,731	30,642	37,490	51,243	63,695	61,686	33,475	July
August	36,753	52,557	33,787	27,070	15,081	28,799	40,790	50,355	59,222	60,872	34,231	August
September	35,135	46,560	33,933	25,967	14,967	31,269	37,225	41,390	54,611	54,711	28,570	September
October	40,890	49,899	34,237	24,685	15,156	28,058	40,878	37,439	41,220	40,246	19,589	October
November	27,491	33,631	22,012	15,553	10,392	18,691	28,689	36,935	30,255	27,248	23,943	November
December	18,476	23,275	18,665	13,177	9,522	15,580	24,070	39,258	42,162	31,409	31,474	December
Total	341,123	527,057	410,699	313,884	180,413	245,869	403,886	510,683	611,644	618,249	365,349	Total

Total U. S. New Passenger Car and Truck Registrations

	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	
January	152,502	249,660	210,330	151,191	102,269	91,530	84,145	171,394	259,535	328,303	177,760	January
February	183,047	268,227	243,525	157,599	97,371	79,171	119,363	205,412	216,952	256,892	147,910	February
March	278,912	424,170	341,023	231,450	109,066	88,675	207,171	302,988	353,667	424,039	218,477	March
April	362,328	537,974	404,093	302,580	138,877	137,210	261,932	366,435	462,142	452,783	227,923	April
May	383,927	507,006	388,317	281,223	149,978	161,167	259,056	341,167	454,927	457,554	210,989	May
June	346,224	431,512	294,392	230,407	166,628	197,444	258,632	328,603	426,273	418,862	187,031	June
July	355,964	490,446	294,002	224,424	118,919	216,302	266,496	336,421	421,185	427,453	182,371	July
August	366,427	429,443	237,524	182,814	108,538	207,460	233,988	284,206	322,134	367,830	182,185	August
September	306,956	351,012	209,219	150,870	96,860	189,245	184,156	198,488	263,507	290,394	119,839	September
October	325,829	338,596	184,456	127,344	78,351	164,394	181,815	185,828	212,617	243,144	138,642	October
November	239,227	217,387	115,078	91,382	54,750	112,871	136,263	257,197	253,967	223,717	224,796	November
December	179,359	161,830	114,718	80,741	55,205	74,204	99,426	276,452	369,215	211,030	258,447	December
Total	3,480,702	4,407,263	3,036,678	2,222,025	1,276,812	1,739,683	2,292,443	3,254,591	4,016,141	4,102,001	2,256,370	Total

* Figures from R. L. Polk & Co.

U. S. New Car Registrations and Estimated Dollar Volume

Month	1935			1936			1937			1938		
	Units †	Dollar * Volume	Average Price per Car	Units †	Dollar * Volume	Average Price per Car	Units †	Dollar ‡ Volume	Average Price per Car	Units †	Dollar ‡ Volume	Average Price per Car †
January	136,527	\$96,400,000	\$706	215,771	\$149,100,000	\$691	280,350	\$222,300,000	\$768	145,663	\$126,600,000	\$869
February	170,526	119,300,000	700	176,646	120,900,000	684	214,834	167,800,000	781	120,261	104,400,000	868
March	261,421	182,600,000	698	301,256	207,900,000	690	363,477	286,200,000	787	181,037	157,200,000	868
April	319,590	225,400,000	705	397,103	275,700,000	694	385,187	305,300,000	793	192,086	166,800,000	868
May	293,149	199,900,000	682	391,542	271,100,000	692	391,608	309,900,000	791	177,951	154,300,000	866
June	280,309	190,900,000	681	368,469	253,500,000	688	360,159	285,100,000	792	156,290	135,600,000	867
July	285,161	192,500,000	675	356,815	244,600,000	686	365,783	288,200,000	788	148,798	128,400,000	863
August	233,820	157,700,000	674	262,709	181,800,000	692	307,285	244,600,000	796	127,955	110,100,000	860
September	157,071	107,000,000	681	208,517	143,800,000	689	231,851	187,600,000	809	93,165	79,700,000	856
October	147,801	106,700,000	722	170,959	122,000,000	713	202,471	168,000,000	830	118,957	105,700,000	888
November	219,710	152,100,000	692	222,787	162,700,000	730	196,133	176,200,000	898	200,802	172,300,000	857
December	237,161	164,600,000	694	326,697	236,900,000	725	179,687	157,900,000	879	226,832	193,200,000	851
Total	2,742,246	\$1,895,100,000	\$691	3,399,271	\$2,370,000,000	\$697	3,478,825	\$2,799,100,000	\$805	1,889,797	\$1,634,300,000	\$864

† The difference between the number of units shown here and those for new car registrations by years is due to the cars grouped under "Miscellaneous" of which no account is taken in these calculations.

* All calculations are based on list price F.O.B. factory of the five-passenger, four-door sedan in conjunction with new car registrations of each model.

‡ These data are not comparable with previous years as during 1937 and 1938 "Delivered Price at Factory" was used in place of the "List Price F.O.B. Factory" of former years.

New Motor Vehicle Registrations by States*

	Passenger Cars			Trucks			Total New Motor Vehicles			Per Cent of Total		
	1938	1937	1936	1938	1937	1936	1938	1937	1936	1938	1937	1936
Alabama	19,427	34,936	35,198	7,041	12,874	13,187	26,468	47,810	48,385	1.17	1.16	1.21
Arizona	6,738	12,562	12,758	2,051	3,659	3,510	8,789	16,221	16,268	.39	.40	.41
Arkansas	12,244	19,793	19,612	5,909	10,836	9,485	18,153	30,629	29,097	.80	.75	.72
California	148,011	246,075	256,255	23,846	36,901	33,656	171,857	282,976	289,911	7.62	6.90	7.22
Colorado	17,699	32,505	35,721	4,771	8,411	9,060	22,470	40,916	44,781	1.00	1.00	1.11
Connecticut	26,283	51,268	51,342	4,422	7,767	8,240	30,705	59,035	59,582	1.36	1.44	1.48
Delaware	5,429	9,748	8,477	1,161	1,882	1,723	6,590	11,630	10,200	.29	.28	.25
District of Columbia	17,944	28,259	32,787	1,753	2,857	2,940	19,697	31,116	35,727	.87	.76	.89
Florida	26,102	43,445	38,988	6,540	10,722	9,412	32,642	54,167	48,400	1.45	1.32	1.21
Georgia	25,319	48,823	43,581	6,818	12,998	12,941	32,137	61,821	56,522	1.42	1.51	1.41
Idaho	6,883	14,139	14,438	2,613	4,454	41,939	9,496	18,593	19,377	.42	.45	.48
Illinois	133,914	250,205	236,138	18,055	30,451	31,123	151,969	280,656	267,261	6.74	6.84	6.65
Indiana	56,339	123,971	116,280	9,899	18,269	20,027	66,238	142,240	136,307	2.95	3.47	3.39
Iowa	47,489	68,196	71,883	8,940	12,449	12,999	56,429	80,645	84,882	2.50	1.97	2.11
Kansas	27,301	56,315	54,094	7,960	12,409	11,406	35,261	68,724	65,500	1.56	1.67	1.63
Kentucky	22,906	41,391	40,109	7,244	11,597	10,870	30,150	52,988	50,979	1.34	1.29	1.27
Louisiana	24,842	34,084	37,471	6,155	10,111	9,753	30,997	44,195	47,224	1.37	1.08	1.18
Maine	11,038	20,048	17,890	3,315	5,658	5,337	14,353	25,706	23,227	.64	.63	.58
Maryland	27,331	46,371	44,228	4,741	7,763	7,382	32,072	54,134	51,610	1.42	1.32	1.29
Massachusetts	63,682	115,603	117,261	9,459	16,235	15,350	73,141	131,838	132,611	3.24	3.21	3.31
Michigan	87,184	241,156	226,968	11,268	24,549	24,840	98,452	265,705	251,808	4.36	6.48	6.27
Minnesota	52,667	82,874	81,773	8,674	13,555	14,144	61,341	96,429	95,917	2.72	2.35	2.39
Mississippi	13,670	22,646	25,006	5,826	11,176	10,367	19,496	33,822	35,373	.86	.82	.88
Missouri	55,543	89,965	87,687	11,718	19,170	20,142	67,261	109,135	107,829	2.98	2.66	2.68
Montana	10,154	18,062	20,745	4,112	5,044	5,930	14,266	23,106	26,675	.63	.56	.66
Nebraska	22,319	33,640	37,695	4,664	6,202	6,996	26,983	39,845	44,691	1.20	.97	1.11
Nevada	2,576	4,767	5,255	731	1,167	1,210	3,307	5,934	6,465	.15	.14	.16
New Hampshire	7,060	12,961	12,258	1,759	3,022	3,196	8,821	15,983	15,454	.39	.39	.38
New Jersey	70,764	122,103	111,737	11,591	18,446	16,935	82,355	140,549	128,672	3.65	3.43	3.21
New Mexico	6,393	10,781	10,881	2,911	5,089	4,545	9,304	15,870	15,426	.41	.39	.38
New York	194,049	329,951	303,323	26,656	41,922	39,159	220,705	371,873	342,482	9.78	9.07	8.53
North Carolina	33,922	55,341	49,364	9,309	15,691	14,286	43,231	71,032	63,650	1.92	1.73	1.58
North Dakota	8,620	12,060	11,095	2,463	3,193	2,680	11,083	15,253	13,775	.49	.37	.34
Ohio	105,439	250,192	244,865	15,261	28,440	30,028	120,700	278,632	274,893	5.35	6.79	6.84
Oklahoma	34,343	51,580	56,605	8,956	14,702	14,737	43,299	66,282	71,342	1.92	1.62	1.78
Oregon	18,769	35,915	40,460	4,064	7,859	8,050	22,833	43,774	48,510	1.01	1.07	1.21
Pennsylvania	140,332	293,909	273,281	21,044	39,150	41,919	161,376	333,059	315,200	7.15	8.12	7.85
Rhode Island	10,483	20,500	19,309	1,531	2,749	2,594	12,014	23,249	21,903	.53	.57	.55
South Carolina	15,748	26,959	24,020	4,305	7,257	6,091	20,053	34,216	30,111	.89	.83	.75
South Dakota	7,911	12,723	13,556	2,003	2,659	2,962	9,914	15,367	16,518	.44	.38	.41
Tennessee	24,973	42,320	41,959	6,476	10,799	11,062	31,449	53,119	53,021	1.39	1.29	1.32
Texas	103,817	150,093	157,995	25,882	40,905	38,903	129,699	190,998	196,898	5.76	4.66	4.91
Utah	7,045	14,358	14,398	1,984	3,298	3,571	9,029	17,656	17,969	.40	.43	.45
Vermont	4,687	8,799	8,413	1,228	2,444	2,308	5,915	11,243	10,721	.26	.27	.27
Virginia	31,204	50,768	50,346	7,906	12,928	12,904	39,110	63,696	63,250	1.73	1.55	1.57
Washington	23,935	49,699	54,458	5,416	10,222	10,666	29,351	59,921	65,124	1.30	1.46	1.62
West Virginia	16,483	35,679	37,272	4,694	9,269	9,181	21,777	44,948	46,453	.94	1.10	1.16
Wisconsin	48,872	97,241	89,569	8,516	16,412	16,237	57,388	113,652	105,806	2.54	2.77	2.63
Wyoming	5,136	8,968	9,693	1,708	2,627	2,661	6,844	11,595	12,354	.30	.28	.31
Total	1,891,021	3,483,752	3,404,497	365,349	618,249	611,644	2,256,370	4,102,001	4,016,141	100.00	100.00	100.00

* Data from R. L. Polk & Co.

U. S. and WORLD REGISTRATIONS

World Motor Vehicle Registration by Years

	1932	1933	1934	1935	1936	1937	1938
Africa	369,814	383,227	425,573	466,603	562,892	619,867	655,755
America (less U.S.A.) ..	1,896,380	1,827,754	1,860,135	1,917,676	2,001,459	2,105,190	2,214,318
Asia	486,292	506,925	546,201	597,601	625,718	666,719	666,550
Europe	5,498,704	6,052,758	6,656,012	7,136,425	7,791,665	8,455,577	9,065,475
Oceania	740,016	778,856	826,711	890,669	972,059	1,052,511	1,128,637
Total	8,991,206	9,549,520	10,314,632	11,008,974	11,953,793	12,899,864	13,730,735
United States†	24,341,822	23,849,932	24,881,467	26,225,757	28,091,709	29,649,270	29,211,652
World Total	33,333,028	33,399,452	35,196,099	37,234,731	40,045,502	42,549,134	42,942,387

†AUTOMOTIVE INDUSTRIES, all others *The American Automobile* (Overseas Edition).

U. S. Motor Vehicle Registrations by States

(As of December 31, 1938 and 1937)

STATE	Passenger Cars *		Trucks		Buses		Total Registered Motor Vehicles		Per Cent Change	Per Cent of Total		Persons per Motor† Vehicle
	1938	1937	1938	1937	1938	1937	1938	1937		1938	1937	
Alabama	239,178	246,598	50,780	53,070	463	458	290,421	300,126	- 3.3	1.00	1.01	9.86
Arizona	105,447	105,869	22,998	22,973	346	368	128,791	129,210	- 0.5	.44	.44	3.19
Arkansas	167,262	174,277	53,789	59,263	362	348	221,413	233,888	- 5.4	.76	.79	9.24
California (6)	2,339,208	2,319,341	170,483	164,132	(a)	(a)	2,509,691	2,483,473	+ 1.0	8.52	8.38	2.47
Colorado	303,377	304,400	31,447	32,795	1,093	1,043	335,917	338,238	- 0.7	1.15	1.14	3.18
Connecticut	368,351	367,119	63,910	68,070	1,029	1,060	433,290	436,249	- 0.7	1.49	1.47	4.01
Delaware	53,800	53,285	10,510	10,314	(a)	(a)	64,300	63,599	+ 1.1	.22	.21	4.05
District of Columbia ..	149,224	163,886	14,267	18,862	1,378	1,371	164,869	184,119	-10.5	.57	.62	3.80
Florida	350,222	350,079	70,043	70,308	2,249	754	422,514	421,141	+ 0.3	1.45	1.42	3.95
Georgia	357,642	363,641	76,154	78,803	2,583	.....	436,379	442,444	- 1.4	1.50	1.49	7.06
Idaho	109,616	113,477	27,809	28,208	.....	128	137,425	141,813	- 3.1	.47	.48	3.58
Illinois	1,567,775	1,556,702	222,582	220,639	(a)	(a)	1,790,357	1,777,341	+ 0.7	6.14	5.99	4.40
Indiana	793,969	814,564	122,168	140,292	1,149	1,160	917,286	956,016	- 4.1	3.14	3.22	3.78
Iowa	650,133	656,090	92,884	86,636	(a)	(a)	743,017	742,726	.....	2.55	2.51	3.43
Kansas	476,241	493,293	97,744	93,046	.....	346	573,985	586,685	- 2.2	1.97	1.98	3.24
Kentucky	346,940	344,542	63,676	59,341	648	.....	411,264	403,883	+ 1.8	1.41	1.36	7.10
Louisiana	245,274	247,690	77,009	80,630	.....	(b)	322,263	328,320	- 1.9	1.10	1.11	6.61
Maine	155,000	157,596	40,000	43,171	.....	140	195,000	200,907	- 3.0	.67	.68	4.38
Maryland (1)	339,986	331,509	53,926	52,014	1,009	.....	394,921	363,523	+ 2.9	1.35	1.29	4.25
Massachusetts	733,759	737,998	104,134	104,316	4,715	4,927	842,608	847,241	- 0.6	2.89	2.86	5.25
Michigan	1,269,204	1,362,769	139,631	146,117	(a)	.....	1,408,835	1,508,886	- 6.6	4.83	5.09	3.42
Minnesota	705,019	704,155	115,970	117,632	252	282	821,241	822,069	- 0.2	2.81	2.77	3.22
Mississippi	165,000	171,507	51,000	53,072	(b)	(b)	216,000	224,579	- 3.8	.74	.76	9.36
Missouri	705,000	701,438	135,000	134,457	.....	.....	840,000	835,895	+ 0.5	2.88	2.82	4.74
Montana	130,188	133,811	41,138	40,081	.....	(a)	171,326	173,892	- 1.5	.59	.59	3.14
Nebraska	345,500	351,184	63,500	63,667	.....	190	409,000	415,041	- 1.5	1.40	1.40	3.33
Nevada	31,500	32,563	7,650	8,092	(a)	.....	39,150	40,655	- 3.7	.13	.14	2.57
New Hampshire	97,635	100,510	23,587	23,768	(a)	.....	121,232	124,278	- 2.5	.42	.42	4.20
New Jersey	862,899	854,667	131,950	134,458	5,069	5,372	999,918	994,497	+ 0.5	3.43	3.35	4.34
New Mexico	92,262	90,563	26,915	31,117	976	(b)	120,153	121,700	- 1.3	.41	.41	3.51
New York	2,227,839	2,220,379	326,808	333,543	(c) 33,942	(c) 32,832	2,586,589	2,586,754	+ 0.1	8.87	8.72	5.00
North Carolina	449,186	446,454	74,211	73,383	843	696	524,240	520,533	+ 0.7	1.80	1.76	6.66
North Dakota	141,111	141,018	33,061	32,084	84	86	174,256	173,188	+ 0.6	.60	.58	4.05
Ohio (2) (3)	1,489,000	1,695,648	170,800	180,484	.....	(a)	1,659,800	1,876,132	-11.6	5.69	6.33	4.05
Oklahoma	438,874	446,083	92,943	98,675	(c) 2,204	(c) 2,505	534,021	547,263	- 2.5	1.63	1.64	4.77
Oregon	296,837	298,971	59,829	60,660	655	718	357,321	360,349	- 0.9	1.22	1.22	2.87
Pennsylvania	1,743,842	1,751,488	255,654	257,330	5,451	6,082	2,004,947	2,014,880	- 0.5	6.87	6.80	5.07
Rhode Island	149,715	148,633	20,101	19,768	411	438	170,227	168,839	+ 0.8	.58	.57	4.00
South Carolina (4)	237,857	239,793	41,379	39,835	(b)	(b)	279,236	279,628	- 0.1	.96	.94	6.71
South Dakota	153,000	155,856	28,000	28,768	95	93	181,095	184,717	- 2.0	.62	.62	3.82
Tennessee (5)	326,871	341,186	58,744	58,736	(b)	462	385,615	400,384	- 3.7	1.32	1.35	7.50
Texas	1,186,022	1,164,050	316,757	294,639	876	788	1,503,655	1,459,477	+ 3.0	5.15	4.92	4.10
Utah	120,530	105,043	22,432	21,094	710	478	143,672	126,615	+13.3	.44	.43	4.07
Vermont	78,265	78,273	9,042	9,029	95	105	87,402	87,407	.....	.30	.29	4.38
Virginia	366,504	363,997	66,410	67,547	672	641	433,586	432,185	+ 0.3	1.49	1.46	6.24
Washington	439,232	450,143	83,204	84,577	912	763	523,348	535,483	- 2.3	1.79	1.81	3.17
West Virginia	218,784	245,440	43,785	44,558	589	626	260,158	290,624	-10.5	.89	.98	7.16
Wisconsin	700,865	714,754	135,413	145,822	580	.....	836,658	860,576	- 2.8	2.87	2.90	3.49
Wyoming	63,176	64,434	17,589	17,368	275	(b)	81,040	81,602	+ 0.2	.28	.28	2.89
TOTAL	25,081,121	25,476,786	4,058,815	4,107,244	71,716	65,240	29,211,652	29,649,270	- 1.4	100.00	100.00	4.43†

* Includes taxicabs.

† Based on Census Bureau estimate of population as of July 1, 1937.

2 Average

(a) Included with trucks.

(b) Included with passenger cars.

(c) Includes taxicabs.

(1) From April 1 to December 31 for 1937, and from October 1, 1937 to September 30, 1938 for 1938.

(2) Nine months data, April 1, 1938 to December 31, 1938, transfers deducted.

(3) Twelve months data, April 1, 1937 to March 31, 1938, transfers included.

(4) To October 31, 1938.

(5) To November 30, 1938.

(6) Passenger cars include approximately 130,000 light commercial vehicles.

For State Gasoline Taxes and Registration Fees see page 205

U. S. and WORLD

U. S. Motor Vehicle Registrations by Years

Motorcycle and Trailer Registrations

(As of Dec. 31, 1938 and 1937)

State	Motorcycles		Trailers and Semitrailers	
	1938	1937	1938	1937
Alabama.....	773	830	4,113	4,850
Arizona.....	452	423	4,567	4,321
Arkansas.....	517	507	10,477	12,278
California.....	11,240	11,260	142,257	132,932
Colorado.....	1,284	1,316	1,440	1,466
Connecticut.....	1,789	1,996	5,356	4,994
Delaware.....	250	236	2,800	2,645
District of Columbia.....	725	708	2,300	2,152
Florida.....	1,496	1,244	17,066	16,238
Georgia.....	1,371	1,085	12,747	12,292
Idaho.....	548	564	17,999	18,645
Illinois.....	6,848	5,827	23,396	23,210
Indiana.....	4,543	4,092	59,248	61,102
Iowa.....	2,624	2,292	24,804	6,887
Kansas.....	1,084	986	6,728	5,862
Kentucky.....	1,116	951	(2)	(2)
Louisiana.....	1,027	834	13,054	14,321
Maine.....	850	874	9,600	9,751
Maryland.....	1,437	1,549	4,129	3,422
Massachusetts.....	767	1,169	13,108	11,311
Michigan.....	4,295	4,078	141,772	133,863
Minnesota.....	2,226	2,074	31,033	29,704
Mississippi.....	225	234	1,975	2,078
Missouri.....	1,725	1,712	32,000	31,055
Montana.....	456	457	2,953	2,812
Nebraska.....	1,000	985	30,100	30,091
Nevada.....	102	113	1,250	1,262
New Hampshire.....	896	963	4,697	4,471
New Jersey.....	4,757	4,674	7,276	6,692
New Mexico.....	396	337	2,569	2,650
New York.....	11,427	10,230	41,652	36,213
North Carolina.....	1,705	1,449	42,317	40,129
North Dakota.....	296	262	849	816
Ohio.....	8,900	8,194	101,900	119,269
Oklahoma.....	1,090	1,143	25,500	28,471
Oregon.....	1,531	1,559	(2)	(2)
Pennsylvania.....	11,441	10,864	27,052	28,889
Rhode Island.....	809	724	654	571
South Carolina.....	1,021	785	4,707	5,716
South Dakota.....	415	419	18,180	20,121
Tennessee.....	1,464	1,473	(2)	(2)
Texas.....	3,980	3,667	50,944	47,162
Utah.....	444	439	591	953
Vermont.....	450	491	1,835	1,706
Virginia.....	1,685	1,680	9,075	6,730
Washington.....	2,025	2,055	17,826	16,031
West Virginia.....	991	1,161	2,640	3,164
Wisconsin.....	3,346	3,240	5,647	5,411
Wyoming.....	275	281	10,209	10,999
Total.....	110,126	104,686	991,752	960,700

(2) Included with trucks.

	Passenger Cars	Trucks and Buses	Total Motor Vehicles	Per Cent Increase
1895.....	4	.....	4	..
1896.....	16	.....	16	..
1897.....	90	.....	90	..
1898.....	800	.....	800	..
1899.....	3,200	.....	3,200	..
1900.....	8,000	.....	8,000	..
1901.....	14,800	.....	14,800	..
1902.....	23,000	.....	23,000	..
1903.....	32,920	.....	32,920	..
1904.....	54,590	410	55,000	..
1905.....	77,400	600	78,000	42
1906.....	105,900	1,100	107,000	37
1907.....	140,300	1,700	142,000	33
1908.....	194,400	3,100	197,500	39
1909.....	305,950	6,050	312,000	58
1910.....	458,500	10,000	468,500	50
1911.....	619,500	20,000	639,500	36
1912.....	902,600	41,400	944,000	48
1913.....	1,194,262	63,800	1,258,062	33
1914.....	1,625,739	85,600	1,711,339	36
1915.....	2,309,666	136,000	2,445,666	43
1916.....	3,297,996	215,000	3,512,996	44
1917.....	4,657,340	326,000	4,983,340	42
1918.....	5,621,617	525,000	6,146,617	23
1919.....	6,771,074	794,372	7,565,446	23
1920.....	8,225,859	1,006,082	9,231,941	22
1921.....	9,346,195	1,118,520	10,464,715	13
1922.....	10,864,128	1,375,725	12,239,853	17
1923.....	13,479,608	1,612,569	15,092,177	23
1924.....	15,460,649	2,134,724	17,595,373	17
1925.....	17,496,420	2,440,854	19,937,274	13
1926.....	19,237,171	2,764,222	22,001,393	10
1927.....	20,219,224	2,914,019	23,133,243	5
1928.....	21,379,125	3,113,999	24,493,124	6
1929.....	23,121,589	3,379,854	26,501,443	8
1930*.....	23,183,241	3,473,831	26,657,072	0.2
1931*.....	22,567,381	3,426,515	25,993,896	-2.5
1932*.....	21,139,092	3,202,730	24,341,822	-6.4
1933*.....	20,557,493	3,292,439	23,849,932	-2.0
1934*.....	21,535,199	3,346,268	24,881,467	4.3
1935*.....	22,630,715	3,595,042	26,225,757	5.2
1936*.....	24,161,820	3,929,889	28,091,709	7.2
1938*.....	25,081,121	4,130,531	29,211,652	-1.4

AUTOMOTIVE INDUSTRIES count, all others Bureau of Public Roads.

U. S. Registrations 68 Per Cent of World

	Motor Vehicles	Cars*	Trucks*	Buses*	Motorcycles*
Africa.....	655,755	521,696	131,234	..	54,820
Americas (less U. S. A.).....	2,214,828	1,747,085	431,827	35,754	25,270
Asia.....	666,550	413,268	174,397	76,835	101,958
Europe.....	9,065,475	6,301,286	2,493,241	145,948	2,507,180
Oceania.....	1,128,637	840,259	286,797	961	100,818
Total.....	13,731,043	9,823,594	3,517,496	259,518	2,790,046
United States†.....	29,211,652	25,081,121	4,058,615	71,716	110,126
World Total, 1938.....	42,942,695	34,904,715	7,576,311	331,234	2,900,172
World Total, 1937.....	42,549,134	34,659,108	7,435,208	325,325	2,753,585

† Automotive Industries count. All others The American Automobile (Overseas Edition).

** Included with trucks.

* Incomplete for all territories.

REGISTRATIONS

By Special Arrangement with the
American Automobile (Overseas Edition)

THE AMERICAS

COUNTRY	Motor Vehicles	Cars	Trucks	Buses	Motor-cycles
Alaska	3,750	2,500	1,250	...	28
Antigua	314	249	59	6	21
Argentina	279,267	209,896	57,871	11,500	2,000
Bahamas	1,650	1,450	200	a	46
Barbados	2,544	2,107	333	104	95
Bermuda	60	3	51	6	...
Bolivia	2,160	957	1,064	139	...
Brazil	180,000	100,800	54,900	4,300	1,630
British Guiana	1,700	1,400	250	50	175
British Honduras	246	134	112	...	2
Canada	1,381,103	1,161,069	217,603	2,431	12,034
Chile	45,781	31,783	12,469	1,529	700
Colombia	24,143	13,713	7,159	3,271	252
Costa Rica	3,283	2,263	787	233	182
Cuba	42,658	26,789	13,051	2,818	347
Dominica	83	60	23	...	12
Dominican Republic	2,650	1,750	900	...	180
Dutch Guiana	200	140	50	10	30
Ecuador	4,176	1,758	1,939	479	85
French Guiana	347	146	201	...	6
Grenada	560	400	150	10	65
Guadeloupe	2,250	1,775	405	70	90
Guatemala	4,175	2,600	1,575	...	425
Haiti	2,427	1,992	435	a	61
Honduras	1,225	697	519	9	7
Jamaica	12,548	9,691	2,699	158	561
Martinique	2,975	2,320	555	100	120
Mexico	99,470	75,170	18,130	6,170	3,350
Montserrat	112	87	25	...	4
Neth. West Indies	3,851	2,460	888	303	191
Newfoundland	5,024	3,931	1,093	...	178
Nicaragua	842	615	199	28	63
Panama	12,250	10,850	1,400	...	61
Paraguay	2,100	1,500	600	...	339
Peru	18,690	11,332	6,306	1,052	185
Puerto Rico	21,500	16,500	5,000	...	22
St. Lucia	188	153	64	15	7
St. Pierre-Miquelon	102	38	64	...	24
St. Vincent	249	190	29	30	539
Salvador	3,095	2,310	425	360	1,000
Trinidad and Tobago	8,750	6,000	2,200	550	1,100
United States	29,211,652	25,081,121	4,058,815	71,716	110,126
Uruguay	28,990	21,750	7,240	...	150
Venezuela	26,300	15,000	11,300	...	23
Virgin Islands	728	482	223	...	3
West Indies (Other)	350	275	75	...	...

Total 1938 31,426,318 26,828,206 4,490,642 *107,470 *135,396

†Total 1938 2,214,666 1,747,085 431,827 *35,754 *25,270

Total 1937 31,754,460 27,131,148 4,529,574 *93,738 *125,118

†Total 1937 (Revised) 2,105,190 1,654,362 422,330 *28,498 *20,432

a—Included with cars. * Not complete for all territories. † Not including United States.

EUROPE

COUNTRY	Motor Vehicles	Cars	Trucks	Buses	Motor-cycles
Albania	970	404	442	124	35
Azores	888	744	44	100	129
Belgium	226,907	148,221	78,226	2,460	67,946
Bulgaria	4,400	2,700	1,700	...	1,500
Czechoslovakia	64,981	47,974	15,246	1,761	34,000
Danzig	3,555	2,650	850	55	2,000
Denmark	150,778	108,201	42,577	29,324	29,324
Estonia	6,360	3,220	2,850	290	2,840
Faroe Islands	110	27	58	25	7
France	2,250,000	1,750,000	500,000	...	6,350
Finland	47,737	26,850	17,875	3,012	1,582,872
Germany	1,707,496	1,305,608	381,096	20,792	40
Gibraltar	1,155	925	190	...	...
Great Britain	2,542,294	1,916,226	538,532	87,536	436,231
Greece	13,800	6,500	5,100	2,200	1,000
Holland	153,750	97,000	56,750	...	57,000
Hungary	22,050	17,250	4,800	...	10,000
Iceland	1,870	800	1,070	...	...
Ireland	63,000	51,500	11,500	...	3,200
Italy	399,375	303,600	85,875	9,900	154,500
Latvia	6,850	3,500	3,000	350	2,500
Lithuania	2,730	1,790	570	370	1,380
Malta	5,259	3,800	833	626	401
Monaco	1,850	1,450	400	...	150
Northern Ireland	48,134	37,224	9,440	1,470	2,918
Norway	89,653	54,183	31,980	3,490	15,224
Poland	41,948	29,766	10,144	2,038	12,061
Portugal	48,330	35,400	11,280	1,650	4,620
Rumania	27,750	20,500	7,250	...	1,300
Spain	125,000	...	...	...	...
Sweden	215,000	152,000	57,950	5,050	43,800
Switzerland	94,850	72,500	20,650	1,700	26,000
U. S. S. R. (Russia)	677,997	85,387	592,610	...	...
Yugoslavia	18,648	13,386	4,353	909	7,892

Total 1938 9,065,475 6,301,288 2,493,241 145,948 2,507,180

Total 1937 (Revised) 8,455,577 *5,844,596 *2,337,643 *148,338 *2,373,057

* Not complete for all territories.

AFRICA

COUNTRY	Motor Vehicles	Cars	Trucks-Buses	Motor-cycles
Algeria	68,700	59,000	9,700	4,400
Angola	3,250	1,250	2,000	235
Basutoland	900	700	...	...
Bechuanaland	600	425	175	...
Belgian Congo	6,652	3,172	3,480	1,615
British East Africa	25,399	16,512	8,887	2,187
British Somaliland	253	41	212	...
British West Africa	15,769	6,054	9,715	795
Canary Islands	5,975	3,725	2,250	2,675
Egypt	34,825	29,525	5,300	225
French Equatorial Africa	1,265	527	738	1,265
French West Africa	15,803	6,161	9,642	15
Italian East Africa	2,500	...	...	...
Liberia	125	75	50	...
Madagascar	1,175	780	395	20
Mauritius	7,444	5,214	2,230	2,802
Morocco	2,642	2,121	521	...
Nyasaland	61,468	46,363	15,105	5,642
Portuguese East Africa	1,462	872	590	503
Rhodesia	6,351	3,457	2,894	771
Seychelles	22,500	17,500	5,000	1,600
South West Africa	161	135	26	91
Sudan	4,300	3,000	1,300	100
Swaziland	4,500	3,250	2,250	...
Tangier	560	435	125	...
Tripolitania	784	631	153	39
Tunisia	1,505	1,230	275	170
Union of South Africa	19,478	16,060	3,418	1,770
	339,084	294,461	44,603	27,500

Total 1938 655,755 *521,696 *131,234 *54,820

Total 1937 (Revised) 619,867 *494,537 *122,505 *54,728

* Not complete for all countries.

ASIA

COUNTRY	Motor Vehicles	Cars	Trucks	Buses	Motor-cycles
Afghanistan	2,400	400	2,000	...	...
Arabia	2,725	1,696	980	55	23
British Malaya	45,748	33,862	11,886	...	4,220
Ceylon	28,044	21,102	4,307	2,635	2,999
China	44,750	23,750	13,500	7,500	...
Chosen	9,500	2,600	3,900	3,000	1,800
Cyprus	2,050	...	...	...	467
French Indo China	20,530	16,235	4,295	...	733
Hongkong	4,665	3,611	1,054	...	285
India	178,124	127,478	20,333	30,313	11,417
Iran	11,522	3,772	7,380	370	250
Iraq	6,441	4,169	2,272	...	132
Japanese Empire	140,000	65,000	55,000	20,000	82,000
Macao	400	220	180	...	...
Manchukuo	4,550	1,800	2,050	700	190
Netherlands East Indies	73,777	51,819	12,615	9,343	12,969
Palestine	9,630	5,900	2,750	980	1,410
Philippine Islands	50,000	31,500	18,500	...	500
Siam	10,850	5,900	4,250	700	770
Syria	10,859	8,716	1,661	482	777
Trans Jordan	501	301	167	33	16
Turkey	9,484	3,443	5,317	724	1,000

Total 1938 666,550 *413,268 *174,397 *76,835 *101,958

Total 1937 (Revised) 666,719 *401,962 *181,944 *80,763 *98,441

* Not complete for all countries. † Included in trucks. †† Included in cars.

OCEANIA

COUNTRY	Motor Vehicles	Cars	Trucks	Buses	Motor-cycles
Australia	799,750	578,000	221,750	...	80,250
Cook Islands	84	41	43	...	5
Fiji Islands	1,747	1,050	434	263	107
French Oceania	500	350	150	...	75
Hawaii	60,000	48,500	11,500	...	600
New Guinea	600	375	225	...	35
New Zealand	285,028	211,792	52,546	690	19,733
Other Oceania	600	...	...	...	...
Samoa	328	151	149	28	13

Total 1938 1,129,637 *840,259 *286,797 *981 *100,818

Total 1937 (Revised) 1,052,511 *786,983 *263,542 *1,486 *102,271

* Not complete for all territories. † Included with trucks.

Passenger Car Representations by Makes—By Years*

	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938
Buick	3,533	3,241	3,003	2,608	2,472	2,273	2,303	2,465	2,516	2,750	2,657
Cadillac-La Salle	762	722	700	654	602	563	541	649	648	803	695
Chevrolet	8,987	9,553	9,558	9,412	9,039	8,885	8,578	8,667	8,776	8,752	8,406
Chrysler	3,647	3,337	3,007	3,454	2,999	3,511	4,360	4,309	4,097	3,837	3,383
De Soto	307	1,133	1,369	1,234	1,252	1,359	1,880	3,406	2,888	2,926	2,688
Dodge	3,212	2,994	2,842	2,663	2,722	2,772	3,297	3,772	4,087	4,380	4,113
Ford	8,731	8,598	8,833	8,735	8,280	7,480	7,388	7,948	8,301	8,245	7,825
Graham	1,492	1,751	1,469	1,206	1,079	920	782	1,120	958	877	611
Hudson	3,508	3,488	2,863	2,270	1,761	1,842	2,641	3,023	3,263	3,390	2,681
Hupmobile	1,265	1,296	1,084	991	854	699	763	771	.....	302	191
Lincoln Zephyr .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,695
Nash	1,986	2,123	1,884	1,677	1,430	1,201	1,283	1,400	1,314	1,753	1,533
Oldsmobile	1,656	1,668	1,592	1,426	1,351	1,418	1,611	2,227	2,454	2,588	2,493
Packard	762	776	721	682	624	540	486	843	1,128	1,283	1,098
Plymouth .....	.....	.....	7,218	7,351	6,276	7,642	9,537	11,487	11,072	11,143	10,184
Pontiac	4,386	4,545	3,435	2,887	2,503	2,336	2,314	2,791	3,413	4,006	3,411
Studebaker	2,262	2,242	1,971	1,999	1,927	1,733	1,986	1,832	2,080	2,335	1,873
Willys-Overland	4,669	4,751	3,783	2,904	2,739	.....	.....	.....	580	1,476	1,143
Total	51,165	52,218	55,332	52,153	47,910	45,174	49,750	56,710	57,575	60,846	56,680
Miscellaneous	11,707	10,836	7,409	7,020	5,527	4,854	3,852	3,046	1,779	2,289	366
Total Representations..	62,872	63,054	62,741	59,173	53,437	50,028	53,602	59,756	59,354	63,135	57,046

* Chilton Trade List Count as of the end of each year.

Note—The term "Passenger car representation" refers to retail outlets of any given make. A dealer organization often handles more than one make of passenger car.

Automotive Sales Outlets by States*

STATE	Total Registered Motor Vehicles 1938	WHOLESALE		DEALERS				REPAIR SHOPS			All Retail Outlets	Motor Vehicles Per Retail Outlet	All Truck Fleets (8 or more Trucks)
		Number of Wholesalers	Motor Vehicles Per Wholesaler	Passenger Car Dealers	Exclusive Truck Dealers	Total Car and Truck Dealers	Total Truck Dealers	Motor Vehicles Per Car and Truck Dealer	Car Dealer Service Stations	Independent Repair Shops	Total Repair Shops		
Alabama	290,421	69	4,209	331	19	350	281	829	245	289	634	433	216
Arizona	128,791	27	4,770	144	5	149	97	864	142	167	309	331	90
Arkansas	221,413	77	2,875	425	28	453	329	488	433	519	952	985	120
California	2,509,691	497	5,050	1,938	110	2,048	1,368	1,225	1,912	5,071	6,983	7,479	1,764
Colorado	335,917	67	4,983	439	28	467	313	715	451	527	978	1,025	250
Connecticut	433,290	100	4,333	579	27	606	349	715	580	762	1,362	1,496	556
Delaware	64,300	13	4,946	87	2	89	28	722	77	103	180	200	321
District of Columbia	164,869	26	6,341	94	3	97	35	1,699	87	152	239	260	634
Florida	422,514	102	4,142	478	33	511	340	826	501	548	1,049	1,102	383
Georgia	436,379	94	4,642	498	25	523	403	834	520	325	845	882	494
Idaho	137,425	26	5,285	311	19	330	221	416	321	187	508	532	258
Illinois	1,790,357	380	4,711	2,271	116	2,387	1,544	750	2,340	2,866	5,206	5,362	1,831
Indiana	917,286	187	4,905	1,235	42	1,277	776	718	1,243	1,231	2,474	2,525	782
Iowa	743,017	158	4,702	1,494	111	1,605	1,111	462	1,534	1,442	2,976	3,181	359
Kansas	573,985	122	4,704	1,032	63	1,095	745	524	1,047	986	2,033	2,084	275
Kentucky	411,264	100	4,113	701	24	725	462	567	711	469	1,200	1,222	336
Louisiana	322,283	67	4,810	347	27	374	266	861	367	316	683	708	455
Maine	195,000	45	4,333	396	21	417	249	467	412	423	835	841	231
Maryland	394,921	74	5,336	447	15	462	178	854	438	563	1,001	1,075	367
Massachusetts	842,608	216	3,900	1,156	39	1,195	587	705	1,142	1,267	2,409	2,614	322
Michigan	1,408,835	232	6,072	1,740	50	1,790	1,122	767	1,740	1,746	3,486	3,647	1,297
Minnesota	821,241	107	7,675	1,477	40	1,517	625	541	1,468	1,527	2,995	31,04	264
Mississippi	216,000	57	3,789	343	30	373	290	579	366	211	577	557	72
Missouri	840,000	184	4,565	984	33	1,017	651	825	1,583	2,544	2,752	305	725
Montana	171,326	37	4,630	387	47	434	341	394	427	268	695	728	235
Nebraska	409,000	91	4,494	764	38	802	636	509	786	859	1,645	1,725	237
Nevada	39,150	11	3,559	120	3	123	89	318	114	97	211	234	167
New Hampshire	121,232	25	4,849	254	13	267	166	454	259	262	521	536	226
New Jersey	999,918	177	5,649	1,052	49	1,101	618	908	1,017	1,928	2,945	3,119	1,217
New Mexico	120,153	23	5,224	159	10	169	133	710	163	144	307	324	48
New York	2,588,589	543	4,767	2,864	160	3,024	1,860	856	2,841	5,453	8,294	8,791	2,848
North Carolina	524,240	108	4,854	660	21	681	368	769	653	605	1,258	1,347	280
North Dakota	174,256	30	5,808	617	27	644	373	320	527	480	1,007	1,066	163
Ohio	1,659,800	380	4,367	2,349	108	2,457	1,445	675	2,201	2,329	4,530	4,744	1,496
Oklahoma	534,021	111	4,811	803	26	829	568	644	742	762	1,504	1,742	306
Oregon	357,321	68	5,254	453	17	470	345	760	462	824	1,286	1,332	268
Pennsylvania	2,004,947	384	5,221	3,135	154	3,289	1,995	609	3,109	4,085	7,194	7,630	2,195
Rhode Island	170,227	29	5,869	156	7	163	112	1,044	147	268	435	480	265
South Carolina	279,236	45	6,205	346	15	361	233	773	354	229	583	626	154
South Dakota	181,095	31	5,841	408	23	431	349	420	425	381	806	846	214
Tennessee	385,615	96	4,016	423	24	447	367	862	436	436	872	906	331
Texas	1,503,655	311	4,834	2,005	185	2,190	1,367	686	2,090	2,934	5,024	5,198	763
Utah	143,672	39	3,680	210	14	224	140	640	215	231	446	308	153
Vermont	87,402	24	3,641	224	11	235	128	371	257	350	577	586	149
Virginia	433,586	75	5,781	672	31	703	368	616	715	648	1,609	1,647	263
Washington	523,348	132	3,964	727	37	764	682	685	742	1,266	2,008	2,099	249
West Virginia	260,158	75	3,468	469	27	516	319	504	610	375	885	908	286
Wisconsin	836,858	133	6,292	1,620	92	1,712	1,208	488	1,681	1,499	3,180	3,311	629
Wyoming	81,040	14	5,788	192	7	199	129	407	189	153	342	362	65
Total	29,211,652	6,019	4,853†	39,936	2,056	41,992	26,909	694†	40,216	50,406	90,622	95,418	25,097

† Average. * Chilton Trade List count as of January, 1939.

Car Dealer Representation by States—By Makes*

STATES	Buick	Cadillac-La Salle	Chevrolet	Chrysler	De Soto	Dodge	Ford	Graham	Hudson-Terraplane	Hupmobile	Lincoln-Zephyr	Nash	Oldsmobile	Packard	Plymouth	Pontiac	Studebaker	Willlys	Miscellaneous	Total
Alabama	20	10	93	19	18	34	92	19	19	14	9	19	5	71	29	10	6	4	472	
Arizona	14	6	29	10	13	19	30	2	7	2	7	11	3	42	17	11	2	3	229	
Arkansas	24	1	117	25	20	42	95	2	15	4	5	15	6	87	30	7	4	4	503	
California	158	51	313	149	150	219	339	49	113	8	244	65	159	65	518	159	141	89	21	3,010
Colorado	31	3	97	43	24	43	93	9	34	3	8	15	23	110	30	21	9	3	612	
Connecticut	40	19	84	57	50	58	81	26	45	11	35	27	41	24	165	53	36	15	7	874
Delaware	5	4	15	4	5	6	13	5	4	4	2	4	6	2	15	8	4	1	99	
District of Columbia	2	1	10	8	11	8	19	9	9	1	6	1	3	2	27	5	7	4	135	
Florida	29	19	94	47	23	50	103	5	21	2	39	11	32	20	120	46	22	28	15	744
Georgia	28	7	133	37	17	56	148	21	21	13	8	24	15	110	23	17	17	2	2	676
Idaho	20	1	67	26	23	36	54	7	33	2	9	12	22	6	85	20	23	8	8	454
Illinois	177	41	463	171	162	220	437	41	139	20	127	114	139	75	553	197	110	72	14	3,272
Indiana	96	22	239	88	91	112	219	15	94	7	72	39	96	27	291	111	73	34	12	1,738
Iowa	107	14	424	126	70	141	315	14	96	6	63	50	93	29	337	133	52	30	4	2,104
Kansas	60	7	245	79	69	97	228	3	96	27	31	60	13	245	82	28	28	6	1	1,404
Kentucky	48	9	131	62	35	84	135	8	42	1	23	16	49	17	181	64	30	20	7	962
Louisiana	20	6	87	32	20	36	90	20	1	7	8	16	6	88	22	10	4	7	473	
Maine	19	8	79	31	22	33	81	8	29	1	3	31	18	8	86	43	19	7	526	
Maryland	27	6	72	48	34	55	83	9	33	14	12	27	14	137	40	24	8	5	648	
Massachusetts	64	36	178	97	102	132	166	33	99	10	28	73	92	54	331	126	56	34	6	1,717
Michigan	128	38	363	120	88	188	329	35	165	15	74	72	127	57	396	187	68	44	21	2,515
Minnesota	112	7	369	152	76	149	308	16	92	8	10	54	61	20	377	117	62	35	6	2,031
Mississippi	19	5	106	31	18	40	92	9	33	9	10	8	14	8	89	30	4	4	3	490
Missouri	56	8	282	71	72	100	218	6	33	22	27	47	25	243	74	26	26	8	1	1,344
Montana	19	6	91	38	12	49	85	4	26	1	5	20	28	11	99	30	31	6	4	565
Nebraska	46	4	214	75	50	72	187	5	39	1	18	21	30	8	197	43	29	18	1	1,057
Nevada	14	1	25	10	7	13	26	2	9	1	4	10	7	2	30	12	9	5	1	188
New Hampshire	16	4	56	17	17	27	51	6	23	1	12	15	9	61	20	8	8	3	354	
New Jersey	68	40	162	92	83	108	172	25	63	6	29	50	77	34	283	96	66	30	18	1,502
New Mexico	17	3	35	16	11	13	36	2	13	1	8	4	12	5	40	16	8	1	1	241
New York	178	78	464	264	217	321	496	52	191	18	138	122	215	110	802	267	140	103	40	4,216
North Carolina	51	12	156	67	37	67	154	2	49	8	9	38	19	171	69	21	11	4	945	
North Dakota	22	3	149	48	26	44	144	1	47	2	1	16	13	4	118	20	20	9	4	691
Ohio	144	40	432	188	192	228	378	59	180	3	39	97	151	72	608	182	115	81	14	3,203
Oklahoma	53	7	198	48	41	82	172	1	39	29	9	44	14	171	86	24	19	8	1	1,045
Oregon	25	9	99	33	35	43	81	15	26	2	35	29	27	10	111	34	25	19	4	662
Pennsylvania	204	60	525	303	241	320	491	68	213	20	215	177	207	119	864	267	190	119	22	4,625
Rhode Island	11	6	25	17	13	15	23	2	17	1	5	9	12	8	45	10	13	3	3	238
South Carolina	27	3	87	28	14	27	89	1	19	1	13	1	18	10	69	31	10	6	1	455
South Dakota	23	3	124	43	32	34	119	2	15	4	9	14	5	109	20	16	5	3	580	
Tennessee	21	6	106	44	31	54	94	1	20	3	14	7	27	7	129	38	12	4	2	620
Texas	136	24	478	168	134	210	421	6	135	7	39	42	107	28	512	172	82	33	20	2,754
Utah	13	1	33	13	24	20	44	6	14	4	2	6	9	4	57	14	14	3	1	292
Vermont	11	7	44	18	14	24	41	6	15	8	9	13	8	56	19	12	10	7	315	
Virginia	45	7	152	70	39	71	171	8	37	5	9	11	38	18	180	70	17	21	7	976
Washington	41	9	134	52	53	86	130	16	46	4	39	24	59	12	191	56	39	27	5	1,023
West Virginia	34	12	94	42	33	47	89	13	36	3	18	14	38	15	122	40	26	24	10	710
Wisconsin	121	20	393	135	104	155	322	17	109	10	149	120	92	39	394	142	76	47	33	2,478
Wyoming	13	1	40	21	15	25	41	3	14	8	6	6	8	61	11	9	3	2	209	
TOTAL	2,657	695	8,406	3,383	2,688	4,113	7,825	611	2,681	191	1,695	1,533	2,493	1,098	10,184	3,411	1,873	1,143	366	57,046

*Chilton Trade List count as of January, 1939

Car Dealer Representation by Makes and by Population Groups*

Population Divisions

MAKE	0-1,000	1,000-2,500	2,500-5,000	5,000-10,000	10,000-25,000	25,000-50,000	50,000-100,000	Over 100,000	Exclusive Dealers	Dealers Handling this Make and One or More Other Makes	Total Dealer Representation
Buick	282	473	508	495	463	164	99	173	1,199	1,458	2,657
Cadillac-La Salle	19	30	55	92	195	117	78	109	131	864	695
Chevrolet	3,152	2,140	1,059	700	562	185	137	471	6,657	1,749	8,406
Chrysler	665	705	515	468	451	164	97	318	.....	3,383	3,383
De Soto	497	437	376	376	400	163	104	335	.....	2,688	2,688
Dodge	604	871	702	584	507	187	110	348	.....	4,113	4,113
Ford	2,598	2,035	1,027	706	552	194	166	547	5,810	2,015	7,825
Graham	55	48	48	70	132	82	52	124	405	208	611
Hudson	485	441	399	374	383	154	111	334	2,157	524	2,681
Hupmobile	18	10	14	16	29	31	28	45	87	104	191
Lincoln-Zephyr	214	325	264	237	255	89	81	230	.....	1,695	1,695
Nash	179	183	188	230	277	134	93	249	1,168	365	1,533
Oldsmobile	258	453	445	429	415	160	101	232	1,168	1,325	2,493
Packard	39	71	121	176	292	134	86	179	634	464	1,098
Plymouth	1,966	2,013	1,593	1,428	1,348	524	311	1,001	.....	10,184	10,184
Pontiac	459	764	627	512	492	180	103	274	2,150	1,261	3,411
Studebaker	224	209	289	297	349	154	101	270	1,392	481	1,873
Willis	172	159	155	150	178	86	67	176	545	598	1,143
Miscellaneous	38	45	28	30	43	5	27	110	23	343	366
Total	12,124	11,412	8,393	7,370	7,323	2,947	1,952	5,525	23,526	33,520	57,046
Per Cent of Total	21.3%	20.0%	14.7%	12.9%	12.8%	5.2%	3.4%	9.7%	.....	.....	100.0%

*Chilton Trade List count as of January, 1939

1939 AMERICAN

Line Number	CAR MAKE AND MODEL	Wheelbase (In.)	Overall Length (In.)	Tread (In.)		Tire Size (In.)	Shipping Weight—Lowest Delivered Price 5 Pass., 4-Door Sedan	Lowest Delivered Price 5 Pass., 4-Door Sedan	ENGINE														
				Front	Rear				No. of Cylinders, Bore and Stroke (In.)	Taxable Hp.	Piston Displacement (Cu. In.)	Maximum Brake Hp. at Specified R.P.M.	Maximum Torque (Lb.-Ft.) at Specified R.P.M.	Comp'n Ratio (to -1)		Cylinder Head Material	Comp'n Pressure (Lb.)		Weight per Cu. In. 5 Pass., 4-Door Sedan	Weight per Hp. 5 Pass., 4-Door Sedan	Hp. per Cu. In.	Displacement ††	Crankshaft †† Revolutions per Mile
														Standard	Optional		Pressure	At What R.P.M.					
1	Bantam..... 60	75 1/4	129 1/4	39 1/4	42 1/4	5.00/15	1270	497 1/2	4-2.2x3.0	7.7	45.6	20-4000	31-2400	7.00	None	CI	125	Cra	27.85	63.50	438	23.0	4375
2	Buick..... 39-40	120	213 1/4	58 1/2	59 1/2	6.50/16	3482	996	8-3 1/2 x 4 1/2	30.6	248.0	107-3400	203-2000	6.10	None	CI	112	Cra	14.04	32.54	431	39.9	3223
3	Buick..... 39-60	126	208 1/4	58 1/2	59 1/2	7.00/15	3782	1246	8-3 1/2 x 4 1/2	37.8	320.2	141-3600	269-2000	6.25	None	CI	114	Cra	11.81	26.82	440	42.3	2839
4	Buick..... 39-80	133	218 1/4	59 1/2	62 1/2	7.00/16	4247	1543	8-3 1/2 x 4 1/2	37.8	320.2	141-3600	269-2000	6.25	None	CI	114	Cra	13.26	30.12	440	39.4	2947
5	Buick..... 39-90	140	225 1/4	59 1/2	62 1/2	7.50/16	4568	2074	8-3 1/2 x 4 1/2	37.8	320.2	141-3600	269-2000	6.25	None	CI	114	Cra	14.26	32.39	440	38.5	3080
6	Cadillac-V8..... 39-61	126	207 1/4	58 1/2	59 1/2	7.00/16	3770	1680	8-3 1/2 x 4 1/2	39.2	346.0	135-3400	250-1700	6.25	(e)	CI	155	1000	10.89	27.92	390	44.5	2764
7	Cadillac-V8..... 39-60S	127	214 1/4	58 1/2	61 1/2	7.00/16	4110	2090	8-3 1/2 x 4 1/2	39.2	346.0	135-3400	250-1700	6.25	(e)	CI	155	1000	11.87	30.44	390	41.2	2764
8	Cadillac-V8..... 39-75	141	225 1/4	60 1/2	62 1/2	7.50/16	4785	2395	8-3 1/2 x 4 1/2	39.2	346.0	140-3400	270-1700	6.70	(b)	CI	170	1000	13.82	34.17	404	40.1	3100
9	Cadillac-V16..... 39-90	141	222 1/4	60 1/2	62 1/2	7.50/16	5105	5140	16-3 1/2 x 3 1/2	67.6	431.0	185-3600	324-1700	6.75	6.08	CI	180	1000	11.84	27.59	429	44.3	2918
10	Chevrolet..... Master-85	112 1/4	199 1/4	56 1/2	59 1/2	6.00/16	2805	689	6-3 1/2 x 3 1/2	29.4	216.5	85-3200	170-(e)	6.25	None	CI	125	Cra	12.95	33.00	392	36.3	2779
11	Chevrolet..... Master De Luxe	112 1/4	190 1/4	57 1/2	59 1/2	6.00/16	2875	745	6-3 1/2 x 3 1/2	29.4	216.5	85-3200	170-(e)	6.25	None	CI	125	Cra	13.27	33.82	392	39.0	3144
12	Chrysler..... Royal C-22	119	201 1/4	56 1/2	60 1/2	6.25/16	3265	1010	6-3 1/2 x 4 1/2	27.3	241.5	100-3600	.....	6.50	7.00	CI	145	1000	13.52	32.65	414	38.5	3018
13	Chrysler..... Imp. C-23	125	207 1/4	57 1/2	60 1/2	7.00/16	3640	1198	8-3 1/2 x 4 1/2	33.8	323.5	130-3400	.....	6.80	7.45	CI	155	1000	11.25	28.00	401	42.5	2756
14	Chrysler..... Cus. Imp. C-24	144	224 1/4	58 1/2	63 1/2	7.50/16	.....	2595	8-3 1/2 x 4 1/2	33.8	323.5	132-3400	.....	6.80	7.45	AI	155	1000	.....	.....	408	.....	3317
15	De Soto..... De L. & C. S-6	119	200 1/4	56 1/2	60 1/2	6.00/16	3174	970	6-3 1/2 x 4 1/2	27.3	228.1	93-3600	.....	6.50	7.00	CI	145	1000	13.91	34.12	407	37.7	3055
16	Dodge..... Spec. & De L. D-11	117	197 1/4	56 1/2	60 1/2	6.00/16	2960	855	6-3 1/2 x 4 1/2	25.3	217.8	87-3600	.....	6.50	None	CI	140	1000	13.59	34.02	399	38.3	3055
17	Ford..... V8-60	112	183 1/4	55 1/2	58 1/2	5.50/16	2525	665	8-2.6x3.2	21.6	136.0	60-3500	94-2500	6.60	None	AI	158	2800	18.56	42.08	441	30.7	3423
18	Ford..... V8-85	112	189 1/4	55 1/2	58 1/2	6.00/16	2750	705	8-3 1/2 x 3 1/2	30.0	221.0	85-3800	155-2200	6.15	None	CI	140	2400	12.44	32.35	384	38.2	2816
19	Graham-Spec. & Cus..... 96	120	203 1/4	56 1/2	61 1/4	6.00/16	3240	965	6-3 1/2 x 4 1/2	25.3	217.8	90-3600	160-.....	6.50	.....	CI	120	Cra	14.87	36.00	413	36.8	3181
20	Graham-Spec. & Cus. Sc..... 97	120	203 1/4	56 1/2	61 1/4	6.25/16	3240	1095	6-3 1/2 x 4 1/2	25.3	217.8	116-4000	180-3000	6.70	None	AI	130	Cra	14.87	37.93	532	.....	3143
21	Hudson 112..... 90, 98	112	(k)	56 1/2	59 1/2	6.00/16	2712	806	6-3x4 1/2	21.6	175.0	86-4000	138-1400	6.50	.....	CI	115	125	15.49	31.53	491	33.3	3062
22	Hudson-Six..... 92	118	193 1/4	56 1/2	59 1/2	6.00/16	2987	898	6-3x5	21.6	212.0	96-3900	160-1200	6.25	.....	CI	120	125	13.66	30.17	452	38.1	3062
23	Hudson-C. C. Six..... 93	122	199 1/4	56 1/2	59 1/2	6.25/16	3023	995	6-3x5	21.6	212.0	101-4000	168-1200	6.25	.....	CI	120	125	14.25	29.93	476	36.3	3025
24	Hudson-C. C. 8..... 95-97	122, 129	(h)	56 1/2	59 1/2	6.50/16	3193	1079	8-3x4 1/2	28.8	254.5	122-4200	198-1600	6.25	.....	CI	118	125	12.54	26.17	479	40.9	2984
25	Hupmobile 6..... R-915	115	(i)	57 1/2	60 1/2	6.00/16	3193	895	6-3 1/2 x 4 1/2	29.4	245.3	101-3600	168-1200	5.75	6.20	CI	107	160	.....	.....	411	.....	3181
26	Hupmobile 6..... 922E	122	(j)	57 1/2	60 1/2	6.25/16	3400	995	6-3 1/2 x 4 1/2	29.4	245.3	101-3600	168-1200	5.75	6.20	CI	107	160	13.86	33.66	411	41.8	3341
27	Hupmobile 8..... 925H	125	206 1/4	58 1/2	60 1/2	6.50/16	4085	1145	8-3 1/2 x 4 1/2	32.5	333.2	120-3500	212-1200	5.80	.....	CI	113	160	13.47	34.04	395	43.2	3296
28	La Salle..... V8, 39-50	120	202 1/4	58 1/2	59 1/2	7.00/16	3740	1320	8-3 1/2 x 4 1/2	36.4	322.0	125-3400	234-1800	6.25	5.75	CI	155	1000	11.61	29.92	388	41.7	2764
29	Lincoln..... V12	136-145	(p)	60	60	7.50/17	5735	4800	12-3 1/2 x 4 1/2	46.8	414.0	150-3400	312-1200	6.38	.....	AI	105	Cra	13.85	38.23	362	39.1	3027
30	Lincoln-Zephyr..... 125	210	55 1/2	58 1/2	7.00/16	3620	1360	930	12-2 1/2 x 3 1/2	36.3	287.0	110-3900	186-2000	6.70	.....	AI	105	Cra	13.55	32.90	411	40.4	3130
31	Mercury..... 116	.....	55 1/2	58 1/2	6.00/16	2900	930	1360	8-3.187x3 1/2	32.5	239.0	95-3600	170-2100	6.15	.....	CI	145	2200	12.13	30.52	397	36.9	2637
32	Nash Lafay..... 3910	117	200 1/4	58 1/2	60 1/2	6.00/16	3290	840	6-3 1/2 x 4 1/2	27.3	234.8	99-3400	179-1200	6.30	None	CI	110	Cra	14.01	33.23	421	37.6	3055
33	Nash Amb. 6..... 3920	121	204 1/4	58 1/2	60 1/2	6.25/16	3450	985	6-3 1/2 x 4 1/2	27.3	234.8	105-3400	190-1050	6.00	None	CI	125	350	14.69	32.85	447	35.6	3018
34	Nash Amb. 8..... 3980	125	208 1/4	55 1/2	61 1/2	7.00/16	3800	1235	8-3 1/2 x 4 1/2	31.2	260.8	115-3400	200-1200	6.00	None	CI	110	350	14.57	33.04	440	34.8	2890
35	Oldsmobile..... 60	115	189 1/4	58 1/2	59 1/2	6.00/16	3000	889	6-3 1/2 x 3 1/2	28.4	216.0	90-3200	170-1600	6.20	5.67	CI	151	1000	13.88	33.33	416	39.3	3204
36	Oldsmobile..... 70	120	197 1/4	58 1/2	59 1/2	6.00/16	3180	952	6-3 1/2 x 4 1/2	28.4	229.7	95-3300	180-1600	6.10	5.61	CI	146	1000	13.84	33.47	413	39.7	3122
37	Oldsmobile..... 80	120	197 1/4	58 1/2	59 1/2	6.50/16	3340	1043	8-3 1/2 x 3 1/2	33.8	257.1	110-3500	200-1800	6.20	5.80	CI	152	1000	12.99	30.36	427	41.6	3296
38	Overland..... 39	102	180 1/4	55 1/2	58 1/2	6.00/16	2249	595	4-3 1/2 x 4 1/2	15.6	134.2	61-3800	106-2230	6.35	6.81	CI	105	185	16.75	36.86	454	35.0	3410
39	Packard Six..... 1700	122	196 1/4	59 1/2	60 1/2	6.50/16	3400	1095	6-3 1/2 x 4 1/2	29.4	245.3	100-3200	.....	6.52	6.85	CI	110	Cra	13.86	34.00	407	40.1	3296
40	Packard Eight..... 1701-2	127, 148	(x)	59 1/2	(i)	7.00/16	3605	1295	8-3 1/2 x 4 1/2	33.8	282.0	120-3600	.....	6.41	6.85	CI	110	Cra	12.78	30.04	425	42.0	3074
41	Packard Super 8..... 1703-5	127, 148	(z)	59 1/2	62 1/2	7.00/16	3930	2035	8-3 1/2 x 5	32.5	320.0	130-3700	.....	6.45	6.95	CI	110	Cra	12.28	30.23	406	44.1	3074
42	Packard Twelve..... 1707-8	134, 139	(y)	60 1/2	61 1/2	8.25/16	5670	4155	12-3 1/2 x 4 1/2	56.7	473.0	175-3200	.....	6.30	7.03	AI	110	Cra	11.98	32.40	369	44.1	2928
43	Plymouth-Roadking..... P7	114	192 1/4	56 1/2	59 1/2	5.50/16	2839	726	6-3 1/2 x 4 1/2	23.4	201.3	82-3600	.....	6.70	7.00	CI	145	1000	14.10	34.62	407	36.0	3007
44	Plymouth-De Luxe..... P8	114	192 1/4	56 1/2	59 1/2	6.00/16	2909	791	6-3 1/2 x 4 1/2	23.4	201.3	82-3600	.....	6.70	7.00	CI	145	1000	14.45	35.47	407	35.9	3055
45	Pontiac-Quincy 6..... 39-25	115	190 1/4	58 1/2	59 1/2	6.00/16	3000	866	6-3 1/2 x 4	28.3													

PASSENGER CARS

Arrangement	VALVES				PISTONS				RINGS				Crankshaft Drive— Make and Type	Crankshaft Counterbalanced	Vibration Damper	No. of Main Bearings	CARBURETOR				Transmission— Location of Shift Lever	Spark Plug— Make and Model	Electrical System—Make	REAR AXLE					Line Number				
	Valve Seat Insert (Exhaust)	Spring Pressure (Lb.)		Intake	Exhst.	Material	Weight (Oz.) Without Rings, Pin or Bushing	Pin Diameter	Pin Locked In	No. and Width— Compression	No. and Width— Oil	Crankpin Diameter (In.)					Crankpin Length (In.)	Make and Size	Model	Type				Final Drive	Torque Medium	Gear Ratio	Front Suspension						
		Open	Closed																									Head Diam.		Seat Angle	Head Diam.	Seat Angle	
L	NO	44	28	1.03	45	1.03	45	Ala	4.75	.609	R	2- $\frac{3}{8}$	1- $\frac{1}{8}$	Own...Ge	Y	N	2	1.31	1.25	Til	1- $\frac{1}{8}$	M10BX	SL	AL	A-9	AL	USL	1- $\frac{1}{2}$	SB	Sp	5.25	Tr	1
I	NO	70	29	1.53	45	1.34	45	Ala	14.25	.812	R	2-(c)	2- $\frac{1}{2}$	LB...Ch	Y	Y	2	2.00	1.21	Car	1- $\frac{1}{8}$	419S	SC	AC	46	DR	Del	1- $\frac{1}{2}$	Hyp	TT	4.44	IC	2
I	NO	70	29	1.78	45	1.43	45	Ala	17.30	.875	R	2-(c)	2- $\frac{1}{2}$	LB...Ch	Y	Y	2	2.25	1.30	Str	1- $\frac{1}{8}$	AAV-26	SC	AC	46	DR	Del	1- $\frac{1}{2}$	Hyp	TT	3.90	IC	3
I	NO	70	29	1.78	45	1.43	45	Ala	17.30	.875	R	2-(c)	2- $\frac{1}{2}$	LB...Ch	Y	Y	2	2.25	1.30	Str	1- $\frac{1}{8}$	AAV-26	SC	AC	46	DR	Del	1- $\frac{1}{2}$	Hyp	TT	4.18	IC	4
I	NO	70	29	1.78	45	1.43	45	Ala	17.30	.875	R	2-(c)	2- $\frac{1}{2}$	LB...Ch	Y	Y	2	2.25	1.30	Str	1- $\frac{1}{8}$	AAV-26	SC	AC	46	DR	Del	1- $\frac{1}{2}$	Hyp	TT	4.55	IC	5
L	NO	145	66	1.88	45	1.63	45	Ala	18.30	.875	F	2-(c)	2- $\frac{1}{2}$	Mor...Ch	Y	Y	3	2.46	2.03	Str	1- $\frac{1}{8}$	AAZ-26	SC	AC	104	DR	Del	1- $\frac{1}{2}$	Hyp	Sp	3.92	IC	6
L	NO	145	66	1.88	45	1.63	45	Ala	18.30	.875	F	2-(c)	2- $\frac{1}{2}$	Mor...Ch	Y	Y	3	2.46	2.03	Str	1- $\frac{1}{8}$	AAZ-26	SC	AC	104	DR	Del	1- $\frac{1}{2}$	Hyp	Sp	3.92	IC	7
L	NO	145	66	1.88	45	1.63	45	Ala	18.30	.875	F	2-(c)	2- $\frac{1}{2}$	Mor...Ch	Y	Y	3	2.46	2.03	Str	1- $\frac{1}{8}$	AAZ-26	SC	AC	104	DR	Del	1- $\frac{1}{2}$	Hyp	Sp	4.58	IC	8
L	NO	98*	50	1.50	45	1.38	45	Ala	15.28	.812	R	2-(c)	1- $\frac{1}{8}$	Mor...Ch	Y	Y	9	2.00	1.75	Car	1- $\frac{1}{8}$	(d)	SC	AC	104	DR	Del	1- $\frac{1}{2}$	Hyp	Sp	4.31	IC	9
I	NO	127	52 $\frac{1}{2}$	1.64	30	1.46	30	CT	22.72	.865	R	2-124	1-186	Var...Ge	Y	Y	4	2.31	1.50	Car	1- $\frac{1}{8}$	420S	SL(n)	AC	46	DR	Del	1- $\frac{1}{2}$	Hyp	TT	3.73	C	10
I	NO	127	52 $\frac{1}{2}$	1.64	30	1.46	30	CT	22.72	.865	R	2-124	1-186	Var...Ge	Y	Y	4	2.31	1.50	Car	1- $\frac{1}{8}$	420S	SL(n)	AC	46	DR	Del	1- $\frac{1}{2}$	Hyp	TT	4.22	IC	11
L	Y	105	42 $\frac{1}{2}$	1.65	45	1.53	45	Ala	.....	.859	F	2- $\frac{1}{8}$	2- $\frac{1}{8}$	Mor...Ch	Y	Y	4	2.12	1.21	Car	1- $\frac{1}{8}$	E6N1	SC	AL	A7	AL	Wii	1- $\frac{1}{2}$	Hyp	Sp	4.10	IC	12
L	Y	126	55	1.53	45	1.34	45	Ala	.....	.859	F	2- $\frac{1}{8}$	2- $\frac{1}{8}$	MW...Ch	Y	Y	5	2.18	1.12	Str	1- $\frac{1}{8}$	AAV-2	SC	AL	A7	AL	Wii	1- $\frac{1}{2}$	Hyp	Sp	3.91	IC	13
L	Y	133	55	1.53	45	1.34	45	Ala	.....	.859	F	2- $\frac{1}{8}$	2- $\frac{1}{8}$	MW...Ch	Y	Y	5	2.18	1.12	Str	1- $\frac{1}{8}$	AAV-2	SC	AL	AL6	AL	Wii	1- $\frac{1}{2}$	Hyp	Sp	4.90	IC	14
L	Y	105	42 $\frac{1}{2}$	1.65	45	1.53	45	Ala	.....	.859	F	2- $\frac{1}{8}$	2- $\frac{1}{8}$	Mor...Ch	Y	Y	4	2.12	1.21	Car	1- $\frac{1}{8}$	E6N1	SC	AL	A7	AL	Wii	1- $\frac{1}{2}$	Hyp	Sp	4.10	IC	15
L	Y	80	36	1.46	45	1.46	45	Alt	.....	.859	F	2- $\frac{1}{8}$	2- $\frac{1}{8}$	Mor...Ch	Y	Y	4	2.06	1.00	Str	1- $\frac{1}{8}$	BXV3	SC	AL	A7	AL	AL	1- $\frac{1}{2}$	Hyp	Sp	4.10	IC	16
L	Y	50	28	1.28	45	1.28	45	CS	8.11	.687	F	2-.0922	1-1537	Cel...Ge	Y	N	3	1.60	1.54	Str	.....	EE1	SL	CH	H10	Own	Own	1- $\frac{1}{2}$	SB	TT	4.44	Tr	17
L	Y	78	38 $\frac{1}{2}$	1.53	45	1.53	45	CS	11.82	.750	F	2-.0917	1-1537	Cel...Ge	Y	N	3	2.00	1.75	Str	.....	EE1	SL	CH	H10	Own	Own	1- $\frac{1}{2}$	SB	TT	3.78	Tr	18
L	N	93	44	1.51	30	1.32	45	Alt	14.12	.812	R	2- $\frac{3}{8}$	2- $\frac{3}{8}$	LB...Ch	Y	Y	4	2.06	1.31	Mar	1- $\frac{1}{8}$	C-2	SL	CH	H10	DR	Wii	1- $\frac{1}{2}$	Hyp	Sp	4.27	C	19
L	N	80	40	1.37	45	1.37	45	Alt	10.50	.812	R	2- $\frac{3}{8}$	2- $\frac{3}{8}$	LB...Ch	Y	Y	4	2.06	1.31	Mar	1- $\frac{1}{8}$	C-3	SL	CH	H10	DR	Wii	1- $\frac{1}{2}$	Hyp	Sp	4.27	C	20
L	N	80	40	1.37	45	1.37	45	Al	10.50	.750	F	2- $\frac{3}{8}$	2- $\frac{3}{8}$	GD...Ge	Y	Y	3	1.93	1.37	Car	1- $\frac{1}{8}$	438S	SC	CH	J8-A	AL	Nat	1- $\frac{1}{2}$	SB	Sp	4.11	C	21
L	N	80	40	1.37	45	1.37	45	Al	10.50	.750	F	2- $\frac{3}{8}$	2- $\frac{3}{8}$	GD...Ge	Y	Y	3	1.93	1.37	Car	1- $\frac{1}{8}$	438S	SC(m)	CH	J8-A	AL	Nat	1- $\frac{1}{2}$	SB	Sp	4.11	C	22
L	N	80	40	1.50	45	1.37	45	Al	10.50	.750	F	2- $\frac{3}{8}$	2- $\frac{3}{8}$	GD...Ge	Y	Y	5	1.93	1.37	Car	1- $\frac{1}{8}$	430S	SC(m)	CH	J8-A	AL	Nat	1- $\frac{1}{2}$	SB	Sp	4.11	C	23
L	N	100	40	1.65	45	1.53	45	Ala	21.70	.875	F	2- $\frac{1}{2}$	2- $\frac{1}{2}$	Mor...Ch	Y	Y	4	2.12	1.25	Car	1- $\frac{1}{8}$	.....	SC(m)	CH	J8-A	AL	Wii	1- $\frac{1}{2}$	Hyp	Sp	4.27	C	24
L	N	100	40	1.65	45	1.53	45	Ala	21.70	.875	F	2- $\frac{1}{2}$	2- $\frac{1}{2}$	Mor...Ch	Y	Y	4	2.12	1.25	Car	1- $\frac{1}{8}$	.....	CH	7	AL	Wii	1- $\frac{1}{2}$	SB	Sp	4.54	C	25	
L	N	100	40	1.53	45	1.40	45	Ala	18.40	.875	F	2- $\frac{1}{2}$	2- $\frac{1}{2}$	Mor...Ch	Y	Y	5	2.25	1.25	Car	1- $\frac{1}{8}$	.....	CH	7	AL	Wii	1- $\frac{1}{2}$	Hyp	Sp	4.54	C	26	
L	N	145	66	1.88	45	1.63	45	Ala	16.88	.875	F	2-(c)	2- $\frac{1}{2}$	Mor...Ch	Y	N	3	2.46	2.03	Car	.....	423S	SC	AC	104	DR	Del	1- $\frac{1}{2}$	Hyp	Sp	3.92	IC	28
L	Y	135	57	1.88	45	1.68	45	Al	12.50	.875	F	2- $\frac{1}{2}$	2- $\frac{1}{2}$	Mor...Ch	Y	Y	4	2.50	2.00	Str	1- $\frac{1}{8}$	EE22	SL	CH	7	AL	Exi	FF	SB	TT	4.58	C	29
L	Y	116	54	1.53	45	1.53	45	CS	11.50	.750	F	2- $\frac{1}{2}$	1-1537	Cel...Ge	Y	Y	4	2.12	1.57	Str	.....	EE1	SL	CH	H10	Own	Own	1- $\frac{1}{2}$	SB	TT	4.44	Tr	30
L	Y	78	38 $\frac{1}{2}$	1.53	45	1.53	45	CS	12.70	.750	F	2-.0917	1-1537	Cel...Ge	Y	N	3	2.14	1.75	Str	.....	EE1	SL	CH	H10	Own	Own	1- $\frac{1}{2}$	SB	TT	3.54	Tr	31
L	N	114	70	1.65	45	1.53	45	Alt	19.25	.875	F	2- $\frac{1}{2}$	2- $\frac{1}{2}$	Whi...Ch	Y	Y	7	2.00	1.42	Str	.....	EE1	SL(r)	AL	B7A	AL	USL	1- $\frac{1}{2}$	Hyp	Sp	4.10	C	32
I	N	.....	.....	1.75	45	1.59	45	Alt	19.25	.875	F	2- $\frac{1}{2}$	2- $\frac{1}{2}$	Whi...Ch	Y	Y	7	2.00	1.42	Car	1- $\frac{1}{8}$	435S	SL(r)	AC	45	AL	USL	1- $\frac{1}{2}$	Hyp	Sp	4.10	C	33
L	N	95 $\frac{1}{2}$	50 $\frac{1}{2}$	1.65	45	1.46	45	Alt	16.00	.875	F	2- $\frac{1}{2}$	2-(t)	Whi...Ch	Y	Y	9	2.00	1.23	Car	1- $\frac{1}{8}$	436S	SL(r)	AC	45	AL	USL	1- $\frac{1}{2}$	Hyp	Sp	4.10	C	34
L	N	95 $\frac{1}{2}$	50 $\frac{1}{2}$	1.56	30	1.42	45	Ala	17.75	.859	P	2- $\frac{3}{8}$	2- $\frac{3}{8}$	Whi...Ch	Y	Y	4	2.12	1.37	Car	1- $\frac{1}{8}$	426S	SC(s)	AC	45	DR	Del	1- $\frac{1}{2}$	Hyp	SA	4.30	IC	35
L	N	94	46	1.56	30	1.42	45	Ala	17.75	.859	P	2- $\frac{3}{8}$	2- $\frac{3}{8}$	Whi...Ch	Y	Y	4	2.12	1.37	Car	1- $\frac{1}{8}$	426S	SC(s)	AC	45	DR	Del	1- $\frac{1}{2}$	Hyp	SA	4.30	IC	36
L	N	100	59 $\frac{1}{2}$	1.53	45	1.46	45	At	16.00	.859	P	2- $\frac{3}{8}$	2- $\frac{3}{8}$	LB...Ch	Y	Y	5	2.12	1.37	Car	1- $\frac{1}{8}$	389S	SC(s)	AC	45	DR	Del	1- $\frac{1}{2}$	Hyp	SA	4.30	IC	37
L	N	100	59 $\frac{1}{2}$	1.53	45	1.46	45	At	12.00	.812	R	2- $\frac{3}{8}$	1- $\frac{1}{8}$	LB...Ch	Y	N	3	1.93	1.30	Til	.....	U-1B	SL	CH	J8	AL	USL	1- $\frac{1}{2}$	SB	Sp	(w)	C	38
L	.....	120	50	1.57	30	1.40	45	Ala	19.50	.875	F	2-1235	1-1862	Mor...Ch	Y	Y	4	2.09	1.25	CG	1- $\frac{1}{8}$	.....	SC	AC	103(g)	AL	Wii	1- $\frac{1}{2}$	Hyp	Sp	4.54	IC	39
L	.....	120	50	1.53	30	1.40	45	Ala	16.87	.875	F	2-1235	1-1862	Mor...Ch	Y	Y	5	2.09	1.25														

Line Number	BUS MAKE AND MODEL	GENERAL										ENGINE											
		Passenger Rating	Type (City Service, Parlor, etc.)	Standard Wheelbase (In.)	Overall Length (In.)	Tread—Front and Rear (In.)	Complete Vehicle Weight (Lb.)	Standard Tire Sizes (In.)		Maximum Permissible Load on Tires (Lb.)		Make and Model	Location	Number of Cylinders Bore and Stroke (In.)	Displacement (Cu. In.)	Rated Horsepower (A.M.A.)	Maximum Brake H.P. at Specified R.P.M.	Maximum Net Torque (Lb. Ft.) at R.P.M.	Valve Arrangement	Oiling System	Fuel System		
								Front	Rear	Front	Rear										Carburetor Make and Type	Carburetor Size (In.)	Gasoline Tank Capacity (Gal.)
1	A. C. F. H-9S	42	CS	245½	395½	80½-72	17500	9.75/22	9.75/22d	8400	16800	HS	180 UF	6-5x6	707	60.0	180-2200	472-1000	I	acde	Zen. Up	2	115
2	A. C. F. H-9P	36	Par	245½	395½	80½-72	19200	9.75/22	9.75/22d	8400	16800	HS	180 UF	6-5x6	707	60.0	183-2200	496-1000	I	acde	Zen. Up	2	135
3	A. C. F. 37P	37	Par	254½	396	80½-72	19720	10.50/22	10.50/22d	10000	20000	HS	189 UF	6-5x6	707	60.0	183-2200	496-1000	I	acde	Zen. Up	2	125
4	A. C. F. H-13	30	CS	158	323½	81½-70¼	13500	9.75/20	9.00/20d	7800	13000	HS	130 UF	6-4½x5	425	43.3	124-2800	290-1000	I	acde	Zen. Up	1½	72
5	A. C. F. H-15S	32	CS	188	324	81½-70¼	13600	9.00/20	9.00/20d	6500	13000	HS	135 UF	6-4½x5	477	48.6	139-2800	324-1000	I	acde	Zen. Up	1½	72
6	A. C. F. H-15P	28	Par	188	328½	81½-70¼	16100	9.75/20	9.75/20d	7800	15600	HS	135 UF	6-4½x5	477	48.6	139-2800	324-1000	I	acde	Zen. Up	1½	85
7	A. C. F. H-16	41	CS	210½	394½	81½-72	17100	10.50/20	9.75/20d	9400	15600	HS	180 UF	6-5x6	707	60.0	180-2200	472-1000	I	acde	Zen. Up	2	90
8	A. C. F. 26S	28	CS	158½	289½	82-72	10920	9.00/18	7.50/20d	6000	8800	HS	95 UF	6-4x5	377	38.4	106-2600	268-1000	I	acde	Zen. Up	1½	60
9	A. C. F. 26U	26	CS	195	295½	82-72	11250	9.00/18	9.00/18d	6000	12000	HS	95 UF	6-4x5	377	38.4	106-2600	268-1000	I	acde	Zen. Up	1½	60
10	A. C. F. 36S	36	CS	188	364	81½-70¼	14200	9.75/20	9.75/20d	7800	15600	HS	135 UF	6-4½x5	477	48.6	139-2800	324-1000	I	acde	Zen. Up	1½	72
11	A. C. F. 31S	31	CS	172½	328½	81½-69¾	12500	9.00/18	9.00/18d	6000	12000	HS	130 UF	6-4½x5	425	43.3	124-2800	290-1000	I	acde	Zen. Up	1½	72
12	Fageol 1350	18-21	Chs	189½	341	70½-75	11750	8.25/20		(1)	(1)	Wau. 6BK RC	6-3½x4½	282	33.8	82-2800	190-1000	L	acdf	Zen. Do	1½	50	
13	Fageol 2500	21-29	Chs	189½	341	70½-75	12500	8.25/20		(2)	(2)	Wau. 6MK RC	6-4½x4½	381	40.8	85-2500	240-900	L	acdf	Zen. Do	1½	50	
14	Fageol 3000	29-36	Chs	189½	341	78-75	15500	9.75/20		(3)	(3)	HS 135 Ms	6-4½x5	477	48.6	130-2800	300-1200	I	acdf	Zen. Do	1½	50	
15	Flexible 16-C-78	16-20	Par	206½	305	58½-73½	7330	7.00/20	7.00/20d			Che. 1939 FH	6-3½x3½	216	29.4	78-3200	170-(6)	I	adf	Car. Do	1½	38	
16	Flexible 19-C-78	19-24	Par	206½	341	58½-73½	7980	7.00/20	7.00/20d			Che. 1939 FH	6-3½x3½	216	29.4	78-3200	170-(6)	I	adf	Car. Do	1½	38	
17	Flexible 20-CL-78	20-25	Par	182½	334½	69½-73½	8980	7.50/20	7.50/20d			Che. 1939 FE	6-3½x3½	216	29.4	78-3200	170-(6)	I	adf	Car. Do	1½	38	
18	Flexible 25-CR-78	25-30	Par	182	351½	76-70¼		7.50/20	7.50/20d			Che. 1939 R	6-3½x3½	216	29.4	78-3200	170-(6)	I	adf	Car. Do	1½	40	
19	Ford 91B97	25	CS	141	296½	74½-65	4630	9.00/18	7.00/20d			Ford F	8-3½x3½	221	30.0	85-3800	150-2000	L	acd	Do		.97	45
20	Ford 99B97	25	CS	141	296½	74½-65	4630	9.00/18	7.00/20d			Ford FH	8-3½x3½	239	32.5	85-3600	170-2100	L	acd	Do			
21	Gar Wood EFT	29	CS	201½	336½	75-65		7.00/20	7.00/20d			Ford 99-B R	8-3½x3½	239	32.5	95-3600	170-2100	L	acd	CG. Do			50
22	Gar Wood EFI	25	Par	201½	336½	75-65		7.00/20	7.00/20d			Ford 99-B R	8-3½x3½	239	32.5	95-3600	170-2100	L	acd	CG. Do			50
23	Mack CW 23-25	CS	165	292	80½-73½		7.50/20	7.50/20d			Own CU RT	6-3½x5	354	38.0	100-2800	237-1000	L	abedg	Str. Up	1½		55	
24	Mack CY 25-27	CS	182	309	80½-73½		7.50/20	7.50/20d			Own CU RT	6-3½x5	354	38.0	100-2800	237-1000	L	abedg	Str. Up	1½		55	
25	Mack CQ 31	CS	178	353½	82-73		9.00/22	9.00/22d			Own CT RT	6-4½x5½	525	48.6	129-2300	108-800	L	abedg	Str. Up	1½		80	
26	Mack CT 33-37	CS	214	389½	82-73		9.00/22	9.00/22d			Own CT RT	6-4½x5½	525	48.6	129-2300	108-800	L	abedg	Str. Up	1½		80	
27	Mack 31SB	Chs	161	265½	68-65		7.00/20	7.00/20d			Own FO	6-3½x4½	253	29.4	75-2800	160-1920	L	abedg	Str. Up	1½		30	
28	Mack 37SB	Chs	230½	301½	68½-65		7.50/20	7.50/20d			Own FM	6-3½x4½	271	31.6	78-2800	178-1000	L	abedg	Str. Up	1½		30	
29	Mack 43SB	Chs	212	329½	77-69¾		8.25/20	8.25/20d			Own FK	6-3½x4½	290	33.7	85-2800	192-1000	L	abedg	Str. Up	1½		40	
30	Mack 43SBX	Chs	212	329½	77-69¾		8.25/20	8.25/20d			Own BG	6-3½x5	310	31.6	90-3000	202-1000	L	abedg	Str. Up	1½		40	
31	Mack 49SB	Chs	231	356½	78½-69¾		8.25/20	8.25/20d			Own CU	6-3½x5	354	38.0	92-2300	237-1000	L	abedg	Str. Up	1½		40	
32	Mack 55SB	Chs	250	383½	77½-69¾		9.00/20	9.00/20d			Own CU	6-3½x5	354	38.0	92-2300	237-1000	L	abedg	Str. Up	1½		40	
33	Reo 383	25-29	Par	213	325	81½-72¼	11170	8.25/18	8.25/18d			Own 361 R	6-4½x4½	361	40.8	106-3000	254-900	L	acd	Zen. Do	1½		75
34	Reo 398	37	CS	177	289	81½-72¼	9270	7.50/18	7.50/18d			Own 310 R	6-3½x5	310	31.5	87-2800	226-1000	L	abed	Zen. Do	1½		43
35	Reo 384	26	CS	150	291	81½-72¼	9460	7.50/18	7.50/18d			Own 310 R	6-3½x5	310	31.5	87-2800	226-1000	L	abed	Zen. Do	1½		43
36	Reo 385	30	CS	186	327	81½-72¼	10390	8.25/18	8.25/18d			Own 361 R	6-4½x4½	361	40.8	106-3000	254-900	L	acd	Zen. Do	1½		43
37	Reo 2LM7	Chs	166	303½	78½-65½		7.00/20	7.00/20d			Own 53 F	6-3½x5	268	27.3	83-2800	178-1200	L	acd	Car. Do	1½		38	
38	Reo 2LM7F	Chs	190	293½	78½-65½		7.00/20	7.00/20d			Own 53 F	6-3½x5	268	27.3	83-2800	178-1200	L	acd	Car. Do	1½		38	
39	Studebaker K15B	Chs	187	310½	60½-66½		9045	6.50/20	7.50/20d	3400	8800	Own IT FH	6-3½x4½	226	26.3	85-3200	163-1200	L	acd	Car. Do	1½		30
40	Studebaker K20MB	Chs	187	310½	68½-65½		10595	7.50/20	8.25/20d	4400	10600	Her JXB UD	6-3½x4½	263	31.5	79-2800	178-1000	L	acd	Car. Do	1½		30
41	Studebaker K25MB	Chs	187	310½	66½-69¾		12570	7.50/20	9.00/20d	4400	13000	Her JXD UD	6-4x4½	320	38.4	86-2600	216-1000	L	acd	Car. Do	1½		30
42	Twin Coach 23R	23	CS	178	282½	82½-73½	9200	8.25/18	8.25/18d	2450	2450	Her JXDTR R	6-4x4½	320	38.4	91-2400	243-800	L	abedg	Zen. Up	1½		50
43	Twin Coach GU	25	CS	178	282½	82½-73½	9000	8.25/18	8.25/18d	2450	2450	Her JXCT R	6-3½x4½	282	33.3	70-2400	177-900	L	abedg	Zen. Up	1½		50
44	Twin Coach 27R	27	CS	210	315½	82½-73½	10170	8.25/18	8.25/18d	2450	2450	Her WXC-3 R	6-4½x4½	383	43.3	104-2400	275-1000	L	abedg	Zen. Up	1½		63
45	Twin Coach 30R	30	CS	235½	342½	81½-74½	11000	9.00/18	8.25/18d	3000	2450	Her WXC-3 R	6-4½x4½	404	43.3	110-2400	292-1000	L	abedg	Zen. Up	1½		63
46	Twin Coach 31RL	31	CS	179½	335	81½-74½	12550	8.25/20	8.25/20d	2550	2650	Her WXLCT-3 R	6-4½x4½	404	43.3	110-2400	292-1000	L	abedg	Zen. Up	1½		80
47	Twin Coach 35RL	35	CS	207½	367	82½-72½	14960	9.75/20	9.75/20d	3900	3900	Her RXLCT R	6-4½x5½	529	51.3	143-2200	404-1000	L	abedg	Zen. Up	1½		90
48	Twin Coach 41RL	41	CS	239½	396	82½-72½	15250	9.75/20	9.75/20d	3900	3900	Her RXLCT R	6-4½x5½	529	51.3	143-2200	404-1000	L	abedg	Zen. Up	1½		90
49	White Zephyr 706M	19	Par	170	288	79½-69½	11800	7.50/20	7.50/20d	4400	8800	Whi 318 FI	6-3½x4½	318	36.0	110-3000	245-1300	L	ab				

BUS CHASSIS

ELECTRICAL SYSTEM					GOVERNOR		TRANSMISSION					REAR AXLE		BRAKES				SPRINGS				RUNNING GEAR								
Ignition System (Make)	Generator and Starter (Make)	Battery		Type	Maximum Governed Speed (M.P.H.)	Integral with Engine	Clutch—Make and Type	Make	No. of Forward Speeds	Low Speed Gear Reduction	Universal Joints Number and Make	Make and Model	Ratio		Service		Hand		Front		Rear		Front Axle—Make	Steering Gear—Make	Outside Diam. of Min. Turning Circle (Ft.)	Wheels—Make	Line Number			
		Voltage	Amp. Hours Capacity										Standard	Optional	Type and Location	Operation	Lining Area (Sq. In.)	Type and Location	Lining Area (Sq. In.)	No. of Leaves	Length and Width (In.)	No. of Leaves						Length and Width (In.)		
DR	DR	Op	12-158	Ce	52	N	Lg. SP	Spi	4	4.36	2-Spi	Tim	59023	5.12	5.62	I-Fw	A	795	Ex-Ts	121	14	54-3 1/2	12	64-5	Tim	R	82	Bd	1	
DR	DR	Op	12-158	Ce	66	N	Lg. SP	Spi	4	4.36	2-Spi	Tim	59023	4.56	4.91	I-Fw	A	795	Ex-Ts	121	14	54-3 1/2	13	64-5	Tim	R	82	Bd	2	
DR	DR	Op	12-158	Ce	66	N	Lg. SP	Spi	4	4.36	2-Spi	Tim	59023	4.59	5.33	I-Fw	A	824	Ex-Ts	121	Va	58-4	Va	64-5	Tim	R	79	Bd	3	
DR	DR	Op	12-158	Ce	53	N	Spi	SP	Spi	3	4.04	2-Spi	Tim	58258WX1	5.57	5.12	I-Fw	A	623	Ex-Ts	88	13	56-3 1/2	16	60-3 1/2	Tim	R	55	Dn	4
DR	DR	Op	12-158	Ce	55	N	Spi	SP	Spi	3	4.04	2-Spi	Tim	58258WX2	5.12	4.56	I-Fw	A	623	Ex-Ts	88	14	56-3 1/2	15	60-4	Tim	R	60	Dn	5
DR	DR	Op	12-158	Ce	66	N	Spi	SP	Spi	4	4.76	2-Spi	Tim	59258	4.56	5.12	I-Fw	A	623	Ex-Ts	88	14	56-3 1/2	15	60-4	Tim	R	60	Bd	6
DR	DR	Op	12-158	Ce	45	N	Lg. DP	Spi	3	3.80	2-Spi	Tim	59023	5.62	5.12	I-Fw	A	824	Ex-Ts	121	13	61-4	11	64-5	Tim	R	72	Dn	7	
DR	DR	Op	12-138	Ce	50	N	Spi	SP	Spi	3	4.01	2-Spi	Tim	54418WX1	5.43		I-Fw	A	460	Ex-Ts	95	12	56-3	14	58 1/2-3	Tim	R	52	Bd	8
DR	DR	Op	12-138	Ce	51	N	Spi	SP	Spi	3	4.01	2-Spi	Tim	54418WX2	5.43		I-Fw	A	460	Ex-Ts	95	12	54-3	16	58 1/2-3	Tim	R	65	Bd	9
DR	DR	Op	12-158	Ce	53	N	Spi	SP	Spi	3	3.80	2-Spi	Tim	58262	5.57		I-Fw	A	692	Ex-Ts	88	11	59-3 1/2	13	60-4	Tim	R	65	Dn	10
DR	DR	Opt	12-158	Ce	52	Y	Spi	SP	Spi	3	3.80	2-Spi	Tim	55515	5.28	4.44	I-Fw	A	575	Ex-Ts	88	13	56-3	16	60-3 1/2	Tim	R	60	Bd	11
DR	DR	Exi	6-127	Ce	52	Y	Lg. SP	WG	4	6.40	2-Spi	Tim	54200-H	5.83		I-Fw	H	306	Ex	61	9	43-3 1/2	13	60-3 1/2	Tim	R	36 1/2	Bd	12	
DR	DR	Exi	6-127	Ce	44	Y	Spi	SP	Spi	3	4.03	2-Spi	Tim	56230-H	6.17		I-Fw	H	355	Ex	45	13	60-3 1/2	12	60-3 1/2	Tim	R	36 1/2	Bd	13
DR	DR	Exi	6-127	Ce	43	Y	Spi	SP	Spi	4	6.63	2-Spi	Tim	58200TW	7.80		I-Fw	A	504	Ex-Ts	45	8	60-3 1/2	12	60-3 1/2	Tim	R	36 1/2	Bd	14
DR	DR	Del	6-105				Che	SP	Che	4	7.23	3-Che	Che	1938	5.43		I-Fw	H	330	I-Rw	215		38-1 1/4		54-2 1/2	Che	Che		Bd	15
DR	DR	Del	6-105				Che	SP	Che	4	7.23	3-Che	Che	1938	5.43		I-Fw	H	330	I-Rw	215		38-1 1/4		54-2 1/2	Che	Che		Bd	16
DR	DR	Del	6-105				Che	SP	Che	4	7.23	3-Che	Che	1938	5.43		I-Fw	H	330	I-Rw	215		52-2 1/2		54-2 1/2	Tim	R		Bd	17
DR	DR	Del	12-105				Che	SP	Cla	4	6.35	2-Spi	Tim	53542TW	5.66		I-Fw	A		-Ts			52-2 1/2		54-2 1/2	Tim	R		Bd	18
Fo	Fo		12-137				Lg. SP	Fo	3	4.30	3-Spi	Ford		6.67	5.14	I-Fw	A	380	I-Rw	120	13	50-2 1/2	13	50-2 1/2	Fo	Fo	54			19
Fo	Fo		12-137				Lg. SP	Fo	3	4.30	3-Spi	Ford		6.67	5.14	I-Fw	A	380	I-Rw	120	13	50-2 1/2	13	50-2 1/2	Fo	Fo	54			20
Fo	LN	Wil	12-150	Su			Lg. SP	Spi	3	3.55	2-Spi	Tim	53300	6.60	5.14	I-Fw	A	381	Ex-Ts			48-3		62-3	Tim	R	74	Bd	21	
Fo	LN	Wil	12-150	Su			Lg. SP	Spi	3	3.55	2-Spi	Tim	53300	5.14	6.60	I-Fw	A	381	Ex-Ts			48-3		62-3	Tim	R	74	Bd	22	
DR	DR	Exi	12-158	Su	45	N	O	SP	Own	3	4.16	2-Cle	Own	CW	4.45	4.90	I-Fw	A	437	Ex-Ts	82	9	52-3	11	52-3	Own	O		O	23
DR	DR	Exi	12-158	Su	45	N	O	SP	Own	3	4.16	2-Cle	Own	CY	4.45	4.90	I-Fw	A	437	Ex-Ts	82	9	52-3	11	52-3	Own	O		O	24
DR	DR	Exi	12-158	Su	49	N	O	SP	Own	3	3.79	2-Cle	Own	CQ	5.43	5.86	I-Fw	A	635	Ex-Ts	86		60-3 1/2		60-4	Own	O		O	25
DR	DR	Exi	12-158	Su	49	N	O	SP	Own	3	3.79	2-Cle	Own	CT	5.43	5.86	I-Fw	A	635	Ex-Ts	86		60-3 1/2		60-4	Own	O		O	26
DR	DR	Exi	6-135		59	N	O	SP	Own	4	6.34	3-Spi	Own		5.83	6.20	I-Fw	H	296	I-Ts	83	9	50-3	13	60-3	Own	O		O	27
DR	DR	Exi	6-135		60	N	O	SP	Own	4	6.34	3-Spi	Own		4.85	5.83	I-Fw	H	329	Ex-Ts	83	9	50-3	13	60-3	Own	O		O	28
DR	DR	Exi	6-118		49	N	O	SP	Own	4	6.34	3-Spi	Own		6.16	6.83	I-Fw	H	370	Ex-Ts	83	10	50-3	11	60-3 1/2	Own	O		O	29
DR	DR	Exi	6-118		45	N	O	SP	Own	5	7.53	4-Spi	Own		6.16	6.83	I-Fw	H	370	Ex-Ts	87	10	50-3	14	60-3 1/2	Own	O		O	30
DR	DR	Exi	6-118		45	N	O	SP	Own	5	7.53	4-Spi	Own		6.16	6.83	I-Fw	H	370	Ex-Ts	87	10	50-3	14	60-3 1/2	Own	O		O	31
DR	DR	Exi	6-118		40	N	O	SP	Own	5	7.53	4-Spi	Own		6.16	6.83	I-Fw	H	370	Ex-Ts	87	12	50-3	14	60-3 1/2	Own	O		O	32
DR	DR	Wil	12-152	Su	53	Y	Lg. SP	Cla	3	3.38	2-Mec	Tim	53562-A1	4.57	4.38	I-Fw	A	470	Ex-Ts	89	10	58-3 1/2	11	58-3 1/2	Tim	R	70 1/2	MW	33	
DR	DR	Wil	12-152	Su	46	Y	Lg. SP	Cla	3	3.38	2-Mec	Tim	53562-A1	5.66	5.14	I-Fw	A	470	Ex-Ts	89	10	58-3 1/2	11	58-3 1/2	Tim	R	57	MW	34	
DR	DR	Wil	12-152	Su	46	Y	Lg. SP	Cla	3	3.38	2-Mec	Tim	53562-A1	5.66	5.14	I-Fw	A	470	Ex-Ts	89	10	58-3 1/2	11	58-3 1/2	Tim	R	56 1/2	MW	35	
DR	DR	Wil	12-152	Su	47	Y	Lg. SP	Cla	3	3.38	2-Mec	Tim	53562-A1	5.14		I-Fw	A	470	Ex-Ts	89	10	58-3 1/2	11	58-3 1/2	Tim	R	69	MW	36	
EA	EA	Wil	6-240				B	SP	Own	4	6.72	3-Cle	Own	2LM7	5.28		I-Fw	H	394	Ex-Ts	61	11	54-2 1/2	11	54-2 1/2	Own	R	51	MW	37
EA	EA	Wil	6-240				B	SP	Own	4	6.72	3-Cle	Own	2LM7	5.28		I-Fw	H	394	Ex-Ts	61	12	54-2 1/2	12	54-2 1/2	Own	R		MW	38
EA	EA	Wil	6-105	Su	43	Y	B	SP	WG	4	6.40	3-Cle	Cla	R-751	5.57	5.12	I-Fw	H	271	Ex-Ts	49	9	36-2	14	56-3	Cla	R	77 1/2	Bd	39
DR	DR	Wil	6-136	Su	62	Y	B	SP	WG	4	6.40	3-Cle	Tim	54414	6.80	4.85	I-Fw	H	420	Ex-Ts	49	9	39-2 1/2	15	56-3	Tim	R	55	Bd	40
DR	DR	Wil	6-136	Su	47	Y	WL	SP	Cla	5	7.58	3-Cle	Tim	56411	6.83	6.16	I-Fw	H	418	I-Rw	274	10	39-2 1/2	15	56-3	Tim	R	55	Bd	41
DR	DR	Exi	12-117	Su		Y	Spi	SP	Spi	3	4.04	2-Spi	Tim	53537-A1	5.67	4.57	I-Fw	A	384	Ex-Ts	31	11	-3	14	60-3	Tim	R	61 1/2	Bd	42
DR	DR	Exi	12-117	Su		Y	Spi	SP	Spi	3	4.04	2-Spi	Tim	53537-A1	5.67	5.14	I-Fw	A	384	Ex-Ts	31	11	-3	14	60-3	Tim	R	61 1/2	Bd	43
DR	DR	Exi	12-117	Su		Y	Spi	SP	Spi	3	4.04	2-Spi	Tim	54419-A1	5.83	4.86	I-Fw	A	384	Ex-Ts	31	13	46-3	14	60-3	Tim	R	70 3/4	Bd	44
DR	DR	Exi	12-117	Su		Y	Spi	SP	Spi	3	4.04	2-Spi	Tim	56216-A1	5.29	6.17	I-Fw	A	384	Ex-Ts	31	13	46-3	15	60-3	Tim	R	78 3/4	Bd	45
DR	DR	Exi	12-134	Su		Y	Spi	SP	Spi	3	4.04	2-Spi	Tim	56216-A1	5.71	6.17	I-Fw	A	576	Ex-Ts	31	10	60-4	12	60-4	Tim	R	63	Bd	46
DR	DR	Exi	12-134																											

Passenger Car Chassis and Engine Trends

(Based on Units Sold)

	No. of Units Sold*	Gross Shipping Wgt. of Cars Sold (lb.)†	Gross Max. Hp. of Cars Sold‡	Average Weight (lb.)	Average Hp.
1930	2,625,979	7,320,000,000	142,800,000	2,780	54
1931	1,908,141	5,380,000,000	109,200,000	2,820	57
1932	1,096,399	3,200,000,000	75,400,000	2,920	69
1933	1,493,794	4,220,000,000	106,000,000	2,820	71
1934	1,888,557	5,560,000,000	156,000,000	2,940	83
1935	2,743,908	8,120,000,000	234,000,000	2,960	85
1936	3,404,497	10,190,000,000	291,000,000	3,000	86
1937	3,483,752	10,470,000,000	303,900,000	3,005	87
1938	1,891,021	6,428,000,000	195,057,000	3,452	103

† Shipping weight of 5-passenger, 4-door sedan, taken as typical.

‡ Maximum horsepower taken from previous Statistical Issues.

* R. L. Polk & Co., registrations of new passenger cars.

(Based on Number of Models Offered)

Hp. per cu. in. of Displacement	Average Compression Ratio		Average B.M.E.P. At Maximum Hp. (Lb. per Sq. In.)		Bore, Stroke, Displacement		
	1927	1928	1927	1928	Bore (Inches)	Stroke (Inches)	Piston Displ. (Cu. In.)
1927	.256	.276	74.5	76.2	3.26	4.67	254.9
1928	.276	.306	76.2	80.6	3.27	4.58	257.7
1929	.306	.331	80.6	82.7	3.27	4.57	261.3
1930	.331	.344	82.7	84.3	3.26	4.51	264.6
1931	.344	.353	84.3	86.2	3.21	4.45	273.0
1932	.353	.376	86.2	88.5	3.26	4.41	283.9
1933	.376	.388	88.5	90.1	3.23	4.40	284.1
1934	.388	.398	90.1	90.2	3.24	4.40	289.2
1935	.398	.411	90.2	92.3	3.23	4.39	271.4
1936	.411	.417	92.3	93.1	3.39	4.32	267.9
1937	.417	.412	93.1	91.2	3.25	4.31	277.6
1938	.412	.415	91.2	92.7	3.25	4.27	271.1
1939	.415		92.7		3.24	4.23	255.3]

Average Piston Speeds (Feet per Min.)	Displacement per Cylinder (Cu. In.)		Average Number of Cylinders		Average R.P.M.		Average Brake Horsepower	
	1927	1928	1927	1928	1927	1928	1927	1928
1927	2150	2210	6.45	6.59	2740	2860	65.8	70.9
1928	2210	2310	6.59	6.71	2860	3063	70.9	81.6
1929	2310	2380	6.71	7.04	3063	3170	81.6	87.6
1930	2380	2395	7.04	7.49	3170	3230	87.6	95.0
1931	2395	2463	7.49	7.78	3230	3250	95.0	101.0
1932	2463	2508	7.78	7.88	3250	3360	101.0	106.5
1933	2508	2535	7.88	7.97	3360	3420	106.5	112.5
1934	2535	2554	7.97	7.51	3420	3480	112.5	109.6
1935	2554	2498	7.51	7.50	3480	3487	109.6	110.1
1936	2498	2554	7.50	7.74	3487	3556	110.1	115.9
1937	2554	2545	7.74	7.60	3556	3576	115.9	111.7
1938	2545	2498	7.60	7.28	3576	3543	111.7	105.9
1939	2498		7.28		3543		105.9	

Ten Leading Industries During 1937 as Reported by Census of Manufactures

(Rated in order of the value of their products)

	Number of Establishments	Salaried Employees	Wage Earners	Salaries	Wages	Cost of Materials, Fuel, Electric Energy, Etc.	Value of Products	Value Added by Manufacture
Steel Works and Rolling-mill products	410	40,496	479,342	\$109,080,427	\$779,776,491	\$1,833,744,640	\$3,330,491,150	\$1,496,746,510
Motor Vehicles, not including motorcycles	131	22,474	194,527	48,673,258	316,141,350	2,394,269,305	3,096,218,569	701,949,264
Meat Packing, wholesale	1,160	25,097	127,476	52,307,756	170,386,207	2,386,090,468	2,787,357,940	401,267,472
Petroleum Refining	365	15,268	83,182	36,393,120	140,414,750	2,064,306,627	2,546,745,730	482,439,103
Motor Vehicle Bodies and Parts	936	26,349	284,813	65,541,738	439,939,723	1,275,073,117	2,080,017,798	804,944,681
Electrical Machinery, apparatus and supplies	1,435	60,047	257,680	133,708,060	355,958,610	642,866,693	1,622,098,291	979,231,598
Bread and other Bakery products	17,193	23,747	239,388	45,460,779	293,994,425	727,021,811	1,426,162,859	699,141,048
Printing and Publishing, newspaper and periodical	9,242	142,377	134,995	273,108,171	221,420,106	392,478,921	1,393,623,224	1,001,144,303
Cigarettes	34	1,506	26,149	3,703,040	24,182,395	771,521,509	968,926,917	197,405,408
Machinery, not elsewhere classified	2,298	36,427	146,629	86,498,075	217,737,078	375,647,346	964,150,996	588,503,650
Total—for ten leading industries	33,204	395,788	1,974,161	\$854,474,424	\$2,959,951,135	\$12,863,020,437	\$20,215,793,474	\$7,352,773,037
Total—for all industries (351)	166,793	1,216,993	8,569,578	\$2,716,473,756	\$10,112,808,089	\$35,536,139,648	\$60,710,072,958	\$25,173,933,310
Per Cent, first ten are of all industries	20%	33%	23%	31%	29%	36%	33%	29%

1939 TRUCK SPECIFICATIONS

FORMULAS
(For Transportation Engineering)

M.P.H. = $\frac{\text{Miles Per Hour}}{\text{R.P.M.} \times \text{D.}}$
 M.P.H. = $\frac{336 \times \text{F.G.R.}}{\text{R.P.M.}}$
 R.P.M. = $\frac{\text{Miles per hour}}{\text{Revolutions per minute.}}$
 D. = Diameter of wheel in inches.
 F.G.R. = Final gear ratio.
 Grade Ability
 G.A. = $\frac{\text{TE}}{\text{RR}}$
 G.A. = Grade ability.
 TE = Tractive effort.
 RR = Road resistance — .012 for hard surfaced roads.

Tractive Effort
 TE = $\frac{\text{In lb. torque} \times \text{F.G.R.} \times \text{EFF}}{\text{G.V.W.} \times \text{R.}}$
 G.V.W. = Gross vehicle weight.
 R. = Rolling radius.
 EFF. = Efficiency — .90 for all rear axles only.
 G.V.W. = Gross vehicle weight.
 in. lb. torque = 12 x torque in lb. ft.

Torque in L.B. FT.
 Torque = $\frac{\text{in. torque}}{12}$
 (This is approximate and should be used only when the exact torque is not known.)
 C.H.P. = $\frac{\text{Torque} \times \text{R.P.M.}}{5252}$
 D = $\frac{\text{B} \times \text{B} \times \text{B} \times \text{S} \times \text{N. of Cyl.}}{24}$
 AMA Horsepower Rating
 AMA H.P. = $\frac{\text{B} \times \text{B} \times \text{N. of Cyl.}}{2.5}$
 D = Cu. in. displacement.
 B = Cylinder bore.
 S = Cylinder stroke.

KEY TO ABBREVIATIONS

GENERAL

Make and Model—Only basic models are listed. Variations are available with most manufacturers.
Tonnage Rating—Where a spread of ratings is given the maximum ratings are for ideal operating conditions and the minimum for extremely difficult conditions; the range between are for varying operating conditions.

Chassis Price—Chassis price quoted applies to standard wheelbase with standard tires. All prices are F.O.B. factory.

Gross Vehicle Weight—Is chassis weight stripped, plus body and cab weight, plus payload. Gross vehicle weight is based on maximum recommended tire size, not on tires listed as standard.

Chassis Weight Stripped—Is weight of standard chassis with standard equipment full, and 5 gal. of gasoline in tank. Does not include weight of cab. Exceptions are noted.

Maximum Tire Size—Is furnished at standard tire size. Dual rear are understocked except where otherwise noted.

Maximum Brake H.P. at Given R.P.M.—Is actual dynamometer reading without accessories.

Gear Ratio Range in High—Ratio between top and bottom gears with no extra cost. Exceptions are noted.

Tractors—Unless given the designation "tractor" or "dumper" they are assumed to be available as tractors.

(C)—Converted Ford or Chevrolet model, identifiable by the engine make listed.

(D)—Diesel equipped.

(N)—Not available as tractor.

(T)—Specifically designed for tractor use only.

c.f.—Cab-Forward

c.o.e.—Cab-over-engine design.

e.b.s.—Engine-between-seat design.

e.u.s.—Engine-under-seat design.

(1) Autocar—Larger service brake areas on rear axles are provided when tire of 24" base are supplied.

(2) Price does not include auxiliary axle. Chassis weight includes auxiliary axle complete; area of brake lining and drum area do not include auxiliary rear axle.

(d) Models intended for dump or tractor service only.

(g) Chevrolet—Governor set not to exceed 45 M.P.H.

(*) Ford—5.83 axle ratio also optional at base cost; 5-speed axle ratios of 5.83 and 8.11 optional at extra cost.

(4) General Motors—Tire size indicated in column "Maximum Tire Size"

AND REFERENCE MARKS

MAKES—ALL

A La F—American La France.
 B—Bendix.
 Bu or Bug—Buda.
 C—Chrysler.
 Co—Covert.
 Cam—Cummins-Diesel.
 East—Eaton.
 F—Ford.
 Her—Hercules.
 L—Lockhead.
 Ly—Lycoming.
 N.P.—New Process.
 O or Ow—Own.
 Op or Opt—Optional.
 S—Shelby.
 Spl—Spicer.
 T or Tim—Timken.
 TW—Timken-Wisconsin.
 WH—Wisconsin.
 W—Waukesha.
 Wau—Waukesha.
 W or Wis—Wisconsin.
 WO—Warner front, Own rear.
 W—Westinghouse.

BRAKE DRUMS

Material
 A—Cast alloy iron.
 A—American Car Fdry.
 C—Centrifuge.
 E—Ermalite.
 G—Gunite.
 P—Pressed steel.
 (Where a combination of any of the above is used, the first reference mark applies to the front and the second to the rear drum.)

FRAME

Type

I—"I" Beam.
 L—Channel reinforced with liner.
 B—Channel reinforced with both liner and ashplate.
 PL—Channel reinforced with plate.
 T—Channel tapered front and rear.
 D—Drop Center.
 T—Tapered front.
 X—X-Braced.

GOVERNOR STANDARD

Y—Yes. N—No

REAR AXLE

Final Drive and Type

B—Bevel.
 D—Dead.
 H—Hypoid.
 S—Spiral bevel.
 W—Worm.
 M—Semi-floating.
 F—Full-floating.
 R—Three-quarter floating.
 (**) Only one ratio.

Drive and Torque

A—Radius Rods and Torque Arm.
 H—Hotchkiss (springs).
 R—Radius Rods.
 T—Torque Tube.
 U—Torque Tube.

WHEELS DRIVEN

2F—Forward unit of Rear Axle Group.
 2R—Rear Unit of Rear Axle Group.
 4F—Front Axle and Forward unit of Rear Axle Group.
 4FR—Front axle and rear unit of rear axle group.
 6—All wheels.

BRAKES—SERVICE

Location

2—Two Wheels, rear only.
 3—Three Wheels, front and rear.
 4—Four Wheels, front and rear.
 6—Six Wheels, front and rear.

Type

I—Internal. X—External.

Operation

A—Air.
 D—Hydraulic and mechanical.
 H—Hydraulic.
 M—Mechanical.
 V—Vacuum.

BRAKES—HAND

Location

C—Center of double propeller shaft.
 2—Rear wheels.
 6—Six wheels.
 J—Jackshaft.
 P—Propeller shaft.

Type

D—Tru-Stop disk. X—External.
 I—Internal.

Furnished" is maximum capacity dual tires recommended for normal operating conditions. AF-300 to AF-850 inclusive are also available for export only as coach chassis. Dual performance rear axles are available on AC-300 to AC-700 and AF-300 to AF-700 inclusive. Double performance rear axles are available on AC-450 to AC-700 and AF-450 to AF-700 inclusive. GMC "420" engine is available on AC-850 and AF-850.

(5) International Harvester—Under certain operating conditions there are certain models of International Harvester heavy duty trucks in line of those shown under the International specifications. As an example Model D-50 is considered standard with FBB-361 engine. Models D-60 and DR-60 are standard with FBB-361 engine. Model D-70 is considered standard with FBB-450 engine. The above also applies to heavy duty six wheel models.

(6) Mack—Weight in Chassis Weight column is stripping weight of medium standard wheelbase, cab, prevailing tire size, ready for the road.

(6) Reo—Also available with four speed transmission and bevel gear rear axle.
 (7) Sterling—Available with Diesel.
 (8) White—Tractor rating only.

(9) Willys—Advertised list price less Federal Tax. Cab. Pick-up \$530; Cab Stake \$545; Panel Delivery \$824. Prices, complete with shock absorbers and front and rear bumpers. Standard tires 6.00/10S-4 ply; 6.00/10S-6 ply optional.

(10) Indiana—These models are for Government use and their chassis price depends upon quantity ordered.

(11) Diamond T—Weights given in Chassis Weight column are average chassis weights.

(12) Available—All models available in c.o.e. design.
 (13) White—This is special model—price on application.

(14) Federal—263 cu. in. engine and 71" wheelbase. Models 428 and 438 are available on Model 40. 428 cu. in. engine available on Models 50 and 50H. Oversize or two-speed rear axles available on Models 15, 18, 20, 25, 29, 30, 35, 40, 45, 48, 50, 55, 60, 65, 70, 75, 80, 85, 89 and 89H. Two or three-speed auxiliary transmissions available on all models. All above equipment furnished at extra cost.

(15) La France—Republic — Chassis weights include cab, water, oil, spare rim or wheel, and approximately five gallons of fuel.

(16) Macrom-Herrington—All Model F Units become Model FF if furnished with 95 h.p. Ford engine. Chassis weight increases 20 lbs., and list price increases \$25.

Rear 32 x 6. ^{††} Rear 7.50/16. (x) Delivered at Factory Price. Includes all Federal Taxes but does not include any state and/or local taxes. (*) Price includes chassis & cab. (E) For export only.
 Dart—Any length wheelbase available at no extra cost. Chevrolet—▲ Gross veh. weight, 8,000 lbs. with 32 x 6—10 ply rear tires. (e) Gross veh. weight—special tire equipment available at extra cost.
 1,000 lbs.—When truck is equipped with two-speed rear axle and special tire equipment at extra cost. (a) Rear tire size, both standard and maximum, 32 x 6—8 ply. (b) 32 x 6—10 ply or 7.50/20—8 ply. (c) 7.50/20—8 ply rear.

abbreviations see page 219

Line Number	MAKE MODEL	GENERAL (See Keynote)				TIRE SIZES		ENGINE DETAILS				TRANSMISSION		REAR AXLE		FRONT AXLE	BRAKES				FRAME													
		Tonnage Rating	Chassis Price	Standard Wheelbase	Gross Weight with Max. Tires	Chassis Wt.	(Clipped) Tire Size	Standard Front and Rear	D-single rear	Make and Model	No. of Cylinders, Bore and Stroke	Displacement	Comp. Ratio	Torque lb. ft.	Max. Brake H.P. at R.P.M. Given	Main Bearings Number and Diameter	Governor Standard	Make and Model	Forward Spd's	Make and Model	Gear and Type	Drive & Torque	Gear Ratio	Range in High	Make and Model	Make Location	Limiting Area	Drum Area	Drum Material	Hand Location	C-A Dimension (Std. W.B.)	Side Rail Dimensions	Type	
1	Ford (E) F-1	116	470	116	4500	116	6.00/16S	6.00/16S	6.00/16S	Own	6-3 x 3 1/2	201	6	148	70-3000	4-2 1/2 x 5 1/2	NNP 36710	Own	5152H	3	OAH	Hy	H 3	70-4	78	OAH	OAH	148	251	C	TX	40 1/2	62 1/2 x 3 1/2	C
2	Ford (E) F-2	126	478	126	4500	126	6.00/16S	6.00/16S	6.00/16S	Own	6-3 x 3 1/2	217	6	158	77-3000	4-2 1/2 x 5 1/2	NNP 36710	Own	5152H	4	OAH	Hy	H 4	80-4	80	OAH	OAH	191	310	TX	TX	51 1/2	62 1/2 x 3 1/2	C
3	Ford (E) F-3	136	486	136	4500	136	6.00/16S	6.00/16S	6.00/16S	Own	6-3 x 3 1/2	228	6	168	83-3000	4-2 1/2 x 5 1/2	NNP 36710	Own	5152H	5	OAH	Hy	H 5	90-4	90	OAH	OAH	252	406	TX	TX	60 1/2	62 1/2 x 3 1/2	C
4	Ford (E) F-4	146	494	146	4500	146	6.00/16S	6.00/16S	6.00/16S	Own	6-3 x 3 1/2	242	6	178	85-3000	4-2 1/2 x 5 1/2	NNP 36710	Own	5152H	6	OAH	Hy	H 6	100-4	100	OAH	OAH	321	502	TX	TX	70 1/2	62 1/2 x 3 1/2	C
5	Ford (E) F-5	156	502	156	4500	156	6.00/16S	6.00/16S	6.00/16S	Own	6-3 x 3 1/2	256	6	188	85-3000	4-2 1/2 x 5 1/2	NNP 36710	Own	5152H	7	OAH	Hy	H 7	110-4	110	OAH	OAH	381	608	TX	TX	80 1/2	62 1/2 x 3 1/2	C
6	Ford (E) F-6	166	510	166	4500	166	6.00/16S	6.00/16S	6.00/16S	Own	6-3 x 3 1/2	270	6	198	85-3000	4-2 1/2 x 5 1/2	NNP 36710	Own	5152H	8	OAH	Hy	H 8	120-4	120	OAH	OAH	450	714	TX	TX	90 1/2	62 1/2 x 3 1/2	C
7	Ford (E) F-7	176	518	176	4500	176	6.00/16S	6.00/16S	6.00/16S	Own	6-3 x 3 1/2	284	6	208	85-3000	4-2 1/2 x 5 1/2	NNP 36710	Own	5152H	9	OAH	Hy	H 9	130-4	130	OAH	OAH	520	820	TX	TX	100 1/2	62 1/2 x 3 1/2	C
8	Ford (E) F-8	186	526	186	4500	186	6.00/16S	6.00/16S	6.00/16S	Own	6-3 x 3 1/2	298	6	218	85-3000	4-2 1/2 x 5 1/2	NNP 36710	Own	5152H	10	OAH	Hy	H 10	140-4	140	OAH	OAH	590	926	TX	TX	110 1/2	62 1/2 x 3 1/2	C
9	Ford (E) F-9	196	534	196	4500	196	6.00/16S	6.00/16S	6.00/16S	Own	6-3 x 3 1/2	312	6	228	85-3000	4-2 1/2 x 5 1/2	NNP 36710	Own	5152H	11	OAH	Hy	H 11	150-4	150	OAH	OAH	660	1032	TX	TX	120 1/2	62 1/2 x 3 1/2	C
10	Ford (E) F-10	206	542	206	4500	206	6.00/16S	6.00/16S	6.00/16S	Own	6-3 x 3 1/2	326	6	238	85-3000	4-2 1/2 x 5 1/2	NNP 36710	Own	5152H	12	OAH	Hy	H 12	160-4	160	OAH	OAH	730	1138	TX	TX	130 1/2	62 1/2 x 3 1/2	C
11	Ford (E) F-11	216	550	216	4500	216	6.00/16S	6.00/16S	6.00/16S	Own	6-3 x 3 1/2	340	6	248	85-3000	4-2 1/2 x 5 1/2	NNP 36710	Own	5152H	13	OAH	Hy	H 13	170-4	170	OAH	OAH	800	1244	TX	TX	140 1/2	62 1/2 x 3 1/2	C
12	Ford (E) F-12	226	558	226	4500	226	6.00/16S	6.00/16S	6.00/16S	Own	6-3 x 3 1/2	354	6	258	85-3000	4-2 1/2 x 5 1/2	NNP 36710	Own	5152H	14	OAH	Hy	H 14	180-4	180	OAH	OAH	870	1350	TX	TX	150 1/2	62 1/2 x 3 1/2	C
13	Ford (E) F-13	236	566	236	4500	236	6.00/16S	6.00/16S	6.00/16S	Own	6-3 x 3 1/2	368	6	268	85-3000	4-2 1/2 x 5 1/2	NNP 36710	Own	5152H	15	OAH	Hy	H 15	190-4	190	OAH	OAH	940	1456	TX	TX	160 1/2	62 1/2 x 3 1/2	C
14	Ford (E) F-14	246	574	246	4500	246	6.00/16S	6.00/16S	6.00/16S	Own	6-3 x 3 1/2	382	6	278	85-3000	4-2 1/2 x 5 1/2	NNP 36710	Own	5152H	16	OAH	Hy	H 16	200-4	200	OAH	OAH	1010	1562	TX	TX	170 1/2	62 1/2 x 3 1/2	C
15	Ford (E) F-15	256	582	256	4500	256	6.00/16S	6.00/16S	6.00/16S	Own	6-3 x 3 1/2	396	6	288	85-3000	4-2 1/2 x 5 1/2	NNP 36710	Own	5152H	17	OAH	Hy	H 17	210-4	210	OAH	OAH	1080	1668	TX	TX	180 1/2	62 1/2 x 3 1/2	C
16	Ford (E) F-16	266	590	266	4500	266	6.00/16S	6.00/16S	6.00/16S	Own	6-3 x 3 1/2	410	6	298	85-3000	4-2 1/2 x 5 1/2	NNP 36710	Own	5152H	18	OAH	Hy	H 18	220-4	220	OAH	OAH	1150	1774	TX	TX	190 1/2	62 1/2 x 3 1/2	C
17	Ford (E) F-17	276	598	276	4500	276	6.00/16S	6.00/16S	6.00/16S	Own	6-3 x 3 1/2	424	6	308	85-3000	4-2 1/2 x 5 1/2	NNP 36710	Own	5152H	19	OAH	Hy	H 19	230-4	230	OAH	OAH	1220	1880	TX	TX	200 1/2	62 1/2 x 3 1/2	C
18	Ford (E) F-18	286	606	286	4500	286	6.00/16S	6.00/16S	6.00/16S	Own	6-3 x 3 1/2	438	6	318	85-3000	4-2 1/2 x 5 1/2	NNP 36710	Own	5152H	20	OAH	Hy	H 20	240-4	240	OAH	OAH	1290	1986	TX	TX	210 1/2	62 1/2 x 3 1/2	C
19	Ford (E) F-19	296	614	296	4500	296	6.00/16S	6.00/16S	6.00/16S	Own	6-3 x 3 1/2	452	6	328	85-3000	4-2 1/2 x 5 1/2	NNP 36710	Own	5152H	21	OAH	Hy	H 21	250-4	250	OAH	OAH	1360	2092	TX	TX	220 1/2	62 1/2 x 3 1/2	C
20	Ford (E) F-20	306	622	306	4500	306	6.00/16S	6.00/16S	6.00/16S	Own	6-3 x 3 1/2	466	6	338	85-3000	4-2 1/2 x 5 1/2	NNP 36710	Own	5152H	22	OAH	Hy	H 22	260-4	260	OAH	OAH	1430	2198	TX	TX	230 1/2	62 1/2 x 3 1/2	C
21	Ford (E) F-21	316	630	316	4500	316	6.00/16S	6.00/16S	6.00/16S	Own	6-3 x 3 1/2	480	6	348	85-3000	4-2 1/2 x 5 1/2	NNP 36710	Own	5152H	23	OAH	Hy	H 23	270-4	270	OAH	OAH	1500	2304	TX	TX	240 1/2	62 1/2 x 3 1/2	C
22	Ford (E) F-22	326	638	326	4500	326	6.00/16S	6.00/16S	6.00/16S	Own	6-3 x 3 1/2	494	6	358	85-3000	4-2 1/2 x 5 1/2	NNP 36710	Own	5152H	24	OAH	Hy	H 24	280-4	280	OAH	OAH	1570	2410	TX	TX	250 1/2	62 1/2 x 3 1/2	C
23	Ford (E) F-23	336	646	336	4500	336	6.00/16S	6.00/16S	6.00/16S	Own	6-3 x 3 1/2	508	6	368	85-3000	4-2 1/2 x 5 1/2	NNP 36710	Own	5152H	25	OAH	Hy	H 25	290-4	290	OAH	OAH	1640	2516	TX	TX	260 1/2	62 1/2 x 3 1/2	C
24	Ford (E) F-24	346	654	346	4500	346	6.00/16S	6.00/16S	6.00/16S	Own	6-3 x 3 1/2	522	6	378	85-3000	4-2 1/2 x 5 1/2	NNP 36710	Own	5152H	26	OAH	Hy	H 26	300-4	300	OAH	OAH	1710	2622	TX	TX	270 1/2	62 1/2 x 3 1/2	C
25	Ford (E) F-25	356	662	356	4500	356	6.00/16S	6.00/16S	6.00/16S	Own	6-3 x 3 1/2	536	6	388	85-3000	4-2 1/2 x 5 1/2	NNP 36710	Own	5152H	27	OAH	Hy	H 27	310-4	310	OAH	OAH	1780	2728	TX	TX	280 1/2	62 1/2 x 3 1/2	C
26	Ford (E) F-26	366	670	366	4500	366	6.00/16S	6.00/16S	6.00/16S	Own	6-3 x 3 1/2	550	6	398	85-3000	4-2 1/2 x 5 1/2	NNP 36710	Own	5152H	28	OAH	Hy	H 28	320-4	320	OAH	OAH	1850	2834	TX	TX	290 1/2	62 1/2 x 3 1/2	C
27	Ford (E) F-27	376	678	376	4500	376	6.00/16S	6.00/16S	6.00/16S	Own	6-3 x 3 1/2	564	6	408	85-3000	4-2 1/2 x 5 1/2	NNP 36710	Own	5152H	29	OAH	Hy	H 29	330-4	330	OAH	OAH	1920	2940	TX	TX	300 1/2	62 1/2 x 3 1/2	C
28	Ford (E) F-28	386	686	386	4500	386	6.00/16S	6.00/16S	6.00/16S	Own	6-3 x 3 1/2	578	6	418	85-3000	4-2 1/2 x 5 1/2	NNP 36710	Own	5152H	30	OAH	Hy	H 30	340-4	340	OAH	OAH	1990	3046	TX	TX	310 1/2	62 1/2 x 3 1/2	C
29	Ford (E) F-29	396	694	396	4500	396	6.00/16S	6.00/16S	6.00/16S	Own	6-3 x 3 1/2	592	6	428	85-3000	4-2 1/2 x 5 1/2	NNP 36710	Own	5152H	31	OAH	Hy	H 31	350-4	350	OAH	OAH	2060	3152	TX	TX	320 1/2	62 1/2 x 3 1/2	C
30	Ford (E) F-30	406	702	406	4500	406	6.00/16S	6.00/16S	6.00/16S	Own	6-3 x 3 1/2	606	6	438	85-3000	4-2 1/2 x 5 1/2	NNP 36710	Own	5152H	32	OAH	Hy	H 32	360-4	360	OAH	OAH	2130	3258	TX	TX	330 1/2	62 1/2 x 3 1/2	C
31	Ford (E) F-31	416	710	416	4500	416	6.00/16S	6.00/16S	6.00/16S	Own	6-3 x 3 1/2	620	6	448	85-3000	4-2 1/2 x 5 1/2	NNP 36710	Own	5152H	33	OAH	Hy	H 33	370-4	370	OAH	OAH	2200	3364	TX	TX	340 1/2	62 1/2 x 3 1/2	C
32	Ford (E) F-32	426	718	426	4500	426	6.00/16S	6.00/16S	6.00/16S	Own	6-3 x 3 1/2	634	6	458	85-3000	4-2 1/2 x 5 1/2	NNP 36710	Own	5152H	34	OAH	Hy	H 34	380-4	380	OAH	OAH	2270	3470	TX	TX	350 1/2	62 1/2 x 3 1/2	C
33	Ford (E) F-33	436	726	436	4500	436	6.00/16S	6.00/16S	6.00/16S	Own	6-3 x 3 1/2	648	6	468	85-3000	4-2 1/2 x 5 1/2	NNP 36710	Own	5152H	35	OAH	Hy	H 35	390-4	390	OAH	OAH	2340	3576	TX	TX	360 1/2	62 1/2 x 3 1/2	C
34	Ford (E) F-34	446	734	446	4500	446	6.00/16S	6.00/16S	6.00/16S	Own	6-3 x 3 1/2	662	6	478	85-3000	4-2 1/2 x 5 1/2	NNP 36710	Own	5152H	36	OAH	Hy	H 36	400-4	400	OAH	OAH	2410	3682	TX	TX	370 1/2	62 1/2 x 3 1/2	C
35	Ford (E) F-35	456	742	456	4500	456	6.00/16S	6.00/16S	6.00/16S	Own	6-3 x 3 1/2	676	6	488	85-3000	4-2 1/2 x 5 1/2	NNP 36710	Own	5152H	37	OAH	Hy	H 37	410-4	410	OAH	OAH	2480	3788	TX	TX	380 1/2	62 1/2 x 3 1/2	C
36	Ford (E) F-36	466	750	466	4500	466	6.00/16S	6.00/16S	6.00/16S	Own	6-3 x 3 1/2	690	6	498	85-3000	4-2 1/2 x 5 1/2	NNP 36710	Own	5152H	38	OAH	Hy	H 38	420-4	420	OAH	OAH	2550	3894	TX				

For abbreviations see page 219

Dec 98 - 99 - 1

† Rear 32 x 6. (*) Price includes chassis and cab. (**) Price includes chassis, cab and body. (x) Delivered at Factory Price. Includes all Federal Taxes but does not include any state and/or local taxes.

Model	Price	Capacity	Engine	Drive	Weight	Dimensions	Notes
84	14100	160	210	10/50/20	10/50/20	10/50/20	
85	14100	160	210	10/50/20	10/50/20	10/50/20	
86	14100	160	210	10/50/20	10/50/20	10/50/20	
87	14100	160	210	10/50/20	10/50/20	10/50/20	
88	14100	160	210	10/50/20	10/50/20	10/50/20	
89	14100	160	210	10/50/20	10/50/20	10/50/20	
90	14100	160	210	10/50/20	10/50/20	10/50/20	
91	14100	160	210	10/50/20	10/50/20	10/50/20	
92	14100	160	210	10/50/20	10/50/20	10/50/20	
93	14100	160	210	10/50/20	10/50/20	10/50/20	
94	14100	160	210	10/50/20	10/50/20	10/50/20	
95	14100	160	210	10/50/20	10/50/20	10/50/20	
96	14100	160	210	10/50/20	10/50/20	10/50/20	
97	14100	160	210	10/50/20	10/50/20	10/50/20	
98	14100	160	210	10/50/20	10/50/20	10/50/20	
99	14100	160	210	10/50/20	10/50/20	10/50/20	
100	14100	160	210	10/50/20	10/50/20	10/50/20	
101	14100	160	210	10/50/20	10/50/20	10/50/20	
102	14100	160	210	10/50/20	10/50/20	10/50/20	
103	14100	160	210	10/50/20	10/50/20	10/50/20	
104	14100	160	210	10/50/20	10/50/20	10/50/20	
105	14100	160	210	10/50/20	10/50/20	10/50/20	
106	14100	160	210	10/50/20	10/50/20	10/50/20	
107	14100	160	210	10/50/20	10/50/20	10/50/20	
108	14100	160	210	10/50/20	10/50/20	10/50/20	
109	14100	160	210	10/50/20	10/50/20	10/50/20	
110	14100	160	210	10/50/20	10/50/20	10/50/20	
111	14100	160	210	10/50/20	10/50/20	10/50/20	
112	14100	160	210	10/50/20	10/50/20	10/50/20	
113	14100	160	210	10/50/20	10/50/20	10/50/20	
114	14100	160	210	10/50/20	10/50/20	10/50/20	
115	14100	160	210	10/50/20	10/50/20	10/50/20	
116	14100	160	210	10/50/20	10/50/20	10/50/20	
117	14100	160	210	10/50/20	10/50/20	10/50/20	
118	14100	160	210	10/50/20	10/50/20	10/50/20	
119	14100	160	210	10/50/20	10/50/20	10/50/20	
120	14100	160	210	10/50/20	10/50/20	10/50/20	
121	14100	160	210	10/50/20	10/50/20	10/50/20	
122	14100	160	210	10/50/20	10/50/20	10/50/20	
123	14100	160	210	10/50/20	10/50/20	10/50/20	
124	14100	160	210	10/50/20	10/50/20	10/50/20	
125	14100	160	210	10/50/20	10/50/20	10/50/20	
126	14100	160	210	10/50/20	10/50/20	10/50/20	
127	14100	160	210	10/50/20	10/50/20	10/50/20	
128	14100	160	210	10/50/20	10/50/20	10/50/20	
129	14100	160	210	10/50/20	10/50/20	10/50/20	
130	14100	160	210	10/50/20	10/50/20	10/50/20	
131	14100	160	210	10/50/20	10/50/20	10/50/20	
132	14100	160	210	10/50/20	10/50/20	10/50/20	
133	14100	160	210	10/50/20	10/50/20	10/50/20	
134	14100	160	210	10/50/20	10/50/20	10/50/20	
135	14100	160	210	10/50/20	10/50/20	10/50/20	
136	14100	160	210	10/50/20	10/50/20	10/50/20	
137	14100	160	210	10/50/20	10/50/20	10/50/20	
138	14100	160	210	10/50/20	10/50/20	10/50/20	
139	14100	160	210	10/50/20	10/50/20	10/50/20	
140	14100	160	210	10/50/20	10/50/20	10/50/20	
141	14100	160	210	10/50/20	10/50/20	10/50/20	
142	14100	160	210	10/50/20	10/50/20	10/50/20	
143	14100	160	210	10/50/20	10/50/20	10/50/20	
144	14100	160	210	10/50/20	10/50/20	10/50/20	
145	14100	160	210	10/50/20	10/50/20	10/50/20	
146	14100	160	210	10/50/20	10/50/20	10/50/20	
147	14100	160	210	10/50/20	10/50/20	10/50/20	
148	14100	160	210	10/50/20	10/50/20	10/50/20	

Four-Wheel-Drive

149	Auto-1 (d) 4x4 DF	5000	163	10/50/20	10/50/20	10/50/20	
150	Auto-1 (d) 4x4 N	5000	163	10/50/20	10/50/20	10/50/20	
151	Auto-1 (d) 4x4 S	5000	163	10/50/20	10/50/20	10/50/20	
152	Auto-1 (d) 4x4 S	5000	163	10/50/20	10/50/20	10/50/20	
153	Corbitt	2775	143	10/50/20	10/50/20	10/50/20	
154	F-12 1 1/2-2 1/2	2775	143	10/50/20	10/50/20	10/50/20	
155	F-12 1 1/2-2 1/2	2775	143	10/50/20	10/50/20	10/50/20	
156	F-12 1 1/2-2 1/2	2775	143	10/50/20	10/50/20	10/50/20	
157	F-12 1 1/2-2 1/2	2775	143	10/50/20	10/50/20	10/50/20	
158	F-12 1 1/2-2 1/2	2775	143	10/50/20	10/50/20	10/50/20	
159	F-12 1 1/2-2 1/2	2775	143	10/50/20	10/50/20	10/50/20	
160	F. W. D.	2600	132	10/50/20	10/50/20	10/50/20	
161	F. W. D.	2600	132	10/50/20	10/50/20	10/50/20	
162	F. W. D.	2600	132	10/50/20	10/50/20	10/50/20	
163	F. W. D.	2600	132	10/50/20	10/50/20	10/50/20	
164	F. W. D.	2600	132	10/50/20	10/50/20	10/50/20	
165	F. W. D.	2600	132	10/50/20	10/50/20	10/50/20	
166	F. W. D.	2600	132	10/50/20	10/50/20	10/50/20	
167	F. W. D.	2600	132	10/50/20	10/50/20	10/50/20	
168	F. W. D.	2600	132	10/50/20	10/50/20	10/50/20	
169	F. W. D.	2600	132	10/50/20	10/50/20	10/50/20	
170	F. W. D.	2600	132	10/50/20	10/50/20	10/50/20	

† Rear 32 x 6. x Front 7.00/20. (*) Price includes Chassis & Cab. For abbreviations see page 219

† Dart—Any length wheelbase available at no extra cost. (*) Price includes chassis and cab. **For abbreviations see page 219**

February 25, 1939

Line Number	MAKE MODEL	GENERAL (See Keynote)				TIRE SIZES				ENGINE DETAILS				TRANSMISSION		REAR AXLE				FRONT AXLE		BRAKES				FRAME																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
		Tonnage Rating	Chassis Price	Standard Wheelbase	Max. W. B.	Gross Vehicle Weight	Max. Lires	Chassis Wt.	(Stripped)	Standard	Rear	Maximum Tire Size	Furnished	Stroke	Cylinders	Displacement	Comp. Ratio	Torque lb. ft.	H.P. at R.P.M.	Number, Diameter, Main Bearings	Governor Standard	Make and Model	Forward Spds.	Make and Model	Gear and Type		Drive & Torque	Range in High	SERVICE				CA Dimension (Std. W. B.)	Side Rail Dimensions																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
																													Area	Drum	Material	Type			Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location	Make	Location	Type	Area	Drum	Material	Type	Location

February 25, 1939

For abbreviations see page 230

TRACK LAYING TYPE

TRACTOR MAKE AND MODEL	OVERALL DIMENSIONS				H.P. RATING	PLOWING SPEED M.P.H.	TRACK		ENGINE						Fuel Recommended	Ignition—Make	Carburetor—Make	Oiling System—Type	Clutch Make and Type	Transmission—Make	Drive Type to Traction Members	No. of Drive Wheels	BELT PULLEY														
	Length		Width	Height			Net Weight (lb.)	Minimum Turning Radius (ft.)	Ground Clearance (in.)	H.P. RATING		No. of Forward Speeds	PLOWING SPEED M.P.H.										Width	Gage—Center to Center	Make	No. of Cylinders	Bore and Stroke	Valve Arrangement	R.P.M. at Normal Operating Speeds	Maximum Brake H.P. at Specified R.P.M.	Maximum Torque (lb. ft.) at R.P.M.	Displacement (Cu. in.)					
	Track Length on Ground	(in.)																																			
W M	56	101 1/2	57 1/2	56 1/2	6500	9	8 1/2	40	33	Y	4	1.8	2.2	3.2	4.1	2.5	12	40	Ovn	4-41 x 5	1200	45-1200	200-900	318	GKD	FM	Zen	Don	DC	Roc-SP	Ovn	SG	2-5	12(e)	8 1/2	963	DM
W M	56	101 1/2	57 1/2	56 1/2	6790	9	8 1/2	40	33	Y	4	1.8	2.2	3.2	4.1	2.5	12	40	Ovn	4-41 x 5	1200	45-1200	200-900	318	GKD	FM	Zen	Don	DC	Roc-SP	Ovn	SG	2-5	12(e)	8 1/2	960	DM
W M	56	101 1/2	57 1/2	56 1/2	6790	9	8 1/2	40	33	Y	4	1.8	2.2	3.2	4.1	2.5	12	40	Ovn	4-41 x 5	1200	45-1200	200-900	318	GKD	FM	Zen	Don	DC	Roc-SP	Ovn	SG	2-5	12(e)	8 1/2	960	DM
W M	56	101 1/2	57 1/2	56 1/2	6790	9	8 1/2	40	33	Y	4	1.8	2.2	3.2	4.1	2.5	12	40	Ovn	4-41 x 5	1200	45-1200	200-900	318	GKD	FM	Zen	Don	DC	Roc-SP	Ovn	SG	2-5	12(e)	8 1/2	960	DM
W M	56	101 1/2	57 1/2	56 1/2	6790	9	8 1/2	40	33	Y	4	1.8	2.2	3.2	4.1	2.5	12	40	Ovn	4-41 x 5	1200	45-1200	200-900	318	GKD	FM	Zen	Don	DC	Roc-SP	Ovn	SG	2-5	12(e)	8 1/2	960	DM
W M	56	101 1/2	57 1/2	56 1/2	6790	9	8 1/2	40	33	Y	4	1.8	2.2	3.2	4.1	2.5	12	40	Ovn	4-41 x 5	1200	45-1200	200-900	318	GKD	FM	Zen	Don	DC	Roc-SP	Ovn	SG	2-5	12(e)	8 1/2	960	DM
W M	56	101 1/2	57 1/2	56 1/2	6790	9	8 1/2	40	33	Y	4	1.8	2.2	3.2	4.1	2.5	12	40	Ovn	4-41 x 5	1200	45-1200	200-900	318	GKD	FM	Zen	Don	DC	Roc-SP	Ovn	SG	2-5	12(e)	8 1/2	960	DM
W M	56	101 1/2	57 1/2	56 1/2	6790	9	8 1/2	40	33	Y	4	1.8	2.2	3.2	4.1	2.5	12	40	Ovn	4-41 x 5	1200	45-1200	200-900	318	GKD	FM	Zen	Don	DC	Roc-SP	Ovn	SG	2-5	12(e)	8 1/2	960	DM
W M	56	101 1/2	57 1/2	56 1/2	6790	9	8 1/2	40	33	Y	4	1.8	2.2	3.2	4.1	2.5	12	40	Ovn	4-41 x 5	1200	45-1200	200-900	318	GKD	FM	Zen	Don	DC	Roc-SP	Ovn	SG	2-5	12(e)	8 1/2	960	DM
W M	56	101 1/2	57 1/2	56 1/2	6790	9	8 1/2	40	33	Y	4	1.8	2.2	3.2	4.1	2.5	12	40	Ovn	4-41 x 5	1200	45-1200	200-900	318	GKD	FM	Zen	Don	DC	Roc-SP	Ovn	SG	2-5	12(e)	8 1/2	960	DM
W M	56	101 1/2	57 1/2	56 1/2	6790	9	8 1/2	40	33	Y	4	1.8	2.2	3.2	4.1	2.5	12	40	Ovn	4-41 x 5	1200	45-1200	200-900	318	GKD	FM	Zen	Don	DC	Roc-SP	Ovn	SG	2-5	12(e)	8 1/2	960	DM
W M	56	101 1/2	57 1/2	56 1/2	6790	9	8 1/2	40	33	Y	4	1.8	2.2	3.2	4.1	2.5	12	40	Ovn	4-41 x 5	1200	45-1200	200-900	318	GKD	FM	Zen	Don	DC	Roc-SP	Ovn	SG	2-5	12(e)	8 1/2	960	DM
W M	56	101 1/2	57 1/2	56 1/2	6790	9	8 1/2	40	33	Y	4	1.8	2.2	3.2	4.1	2.5	12	40	Ovn	4-41 x 5	1200	45-1200	200-900	318	GKD	FM	Zen	Don	DC	Roc-SP	Ovn	SG	2-5	12(e)	8 1/2	960	DM
W M	56	101 1/2	57 1/2	56 1/2	6790	9	8 1/2	40	33	Y	4	1.8	2.2	3.2	4.1	2.5	12	40	Ovn	4-41 x 5	1200	45-1200	200-900	318	GKD	FM	Zen	Don	DC	Roc-SP	Ovn	SG	2-5	12(e)	8 1/2	960	DM
W M	56	101 1/2	57 1/2	56 1/2	6790	9	8 1/2	40	33	Y	4	1.8	2.2	3.2	4.1	2.5	12	40	Ovn	4-41 x 5	1200	45-1200	200-900	318	GKD	FM	Zen	Don	DC	Roc-SP	Ovn	SG	2-5	12(e)	8 1/2	960	DM
W M	56	101 1/2	57 1/2	56 1/2	6790	9	8 1/2	40	33	Y	4	1.8	2.2	3.2	4.1	2.5	12	40	Ovn	4-41 x 5	1200	45-1200	200-900	318	GKD	FM	Zen	Don	DC	Roc-SP	Ovn	SG	2-5	12(e)	8 1/2	960	DM
W M	56	101 1/2	57 1/2	56 1/2	6790	9	8 1/2	40	33	Y	4	1.8	2.2	3.2	4.1	2.5	12	40	Ovn	4-41 x 5	1200	45-1200	200-900	318	GKD	FM	Zen	Don	DC	Roc-SP	Ovn	SG	2-5	12(e)	8 1/2	960	DM
W M	56	101 1/2	57 1/2	56 1/2	6790	9	8 1/2	40	33	Y	4	1.8	2.2	3.2	4.1	2.5	12	40	Ovn	4-41 x 5	1200	45-1200	200-900	318	GKD	FM	Zen	Don	DC	Roc-SP	Ovn	SG	2-5	12(e)	8 1/2	960	DM
W M	56	101 1/2	57 1/2	56 1/2	6790	9	8 1/2	40	33	Y	4	1.8	2.2	3.2	4.1	2.5	12	40	Ovn	4-41 x 5	1200	45-1200	200-900	318	GKD	FM	Zen	Don	DC	Roc-SP	Ovn	SG	2-5	12(e)	8 1/2	960	DM
W M	56	101 1/2	57 1/2	56 1/2	6790	9	8 1/2	40	33	Y	4	1.8	2.2	3.2	4.1	2.5	12	40	Ovn	4-41 x 5	1200	45-1200	200-900	318	GKD	FM	Zen	Don	DC	Roc-SP	Ovn	SG	2-5	12(e)	8 1/2	960	DM
W M	56	101 1/2	57 1/2	56 1/2	6790	9	8 1/2	40	33	Y	4	1.8	2.2	3.2	4.1	2.5	12	40	Ovn	4-41 x 5	1200	45-1200	200-900	318	GKD	FM	Zen	Don	DC	Roc-SP	Ovn	SG	2-5	12(e)	8 1/2	960	DM
W M	56	101 1/2	57 1/2	56 1/2	6790	9	8 1/2	40	33	Y	4	1.8	2.2	3.2	4.1	2.5	12	40	Ovn	4-41 x 5	1200	45-1200	200-900	318	GKD	FM	Zen	Don	DC	Roc-SP	Ovn	SG	2-5	12(e)	8 1/2	960	DM
W M	56	101 1/2	57 1/2	56 1/2	6790	9	8 1/2	40	33	Y	4	1.8	2.2	3.2	4.1	2.5	12	40	Ovn	4-41 x 5	1200	45-1200	200-900	318	GKD	FM	Zen	Don	DC	Roc-SP	Ovn	SG	2-5	12(e)	8 1/2	960	DM
W M	56	101 1/2	57 1/2	56 1/2	6790	9	8 1/2	40	33	Y	4	1.8	2.2	3.2	4.1	2.5	12	40	Ovn	4-41 x 5	1200	45-1200	200-900	318	GKD	FM	Zen	Don	DC	Roc-SP	Ovn	SG	2-5	12(e)	8 1/2	960	DM
W M	56	101 1/2	57 1/2	56 1/2	6790	9	8 1/2	40	33	Y	4	1.8	2.2	3.2	4.1	2.5	12	40	Ovn	4-41 x 5	1200	45-1200	200-900	318	GKD	FM	Zen	Don	DC	Roc-SP	Ovn	SG	2-5	12(e)	8 1/2	960	DM
W M	56	101 1/2	57 1/2	56 1/2	6790	9	8 1/2	40	33	Y	4	1.8	2.2	3.2	4.1	2.5	12	40	Ovn	4-41 x 5	1200	45-1200	200-900	318	GKD	FM	Zen	Don	DC	Roc-SP	Ovn	SG	2-5	12(e)	8 1/2	960	DM
W M	56	101 1/2	57 1/2	56 1/2	6790	9	8 1/2	40	33	Y	4	1.8	2.2	3.2	4.1	2.5	12	40	Ovn	4-41 x 5	1200	45-1200	200-900	318	GKD	FM	Zen	Don	DC	Roc-SP	Ovn	SG	2-5	12(e)	8 1/2	960	DM
W M	56	101 1/2	57 1/2	56 1/2	6790	9	8 1/2	40	33	Y	4	1.8	2.2	3.2	4.1	2.5	12	40	Ovn	4-41 x 5	1200	45-1200	200-900	318	GKD	FM	Zen	Don	DC	Roc-SP	Ovn	SG	2-5	12(e)	8 1/2	960	DM
W M	56	101 1/2	57 1/2	56 1/2	6790	9	8 1/2	40	33	Y	4	1.8	2.2	3.2	4.1	2.5	12	40	Ovn	4-41 x 5	1200	45-1200	200-900	318	GKD	FM	Zen	Don	DC	Roc-SP	Ovn	SG	2-5	12(e)	8 1/2	960	DM
W M	56	101 1/2	57 1/2	56 1/2	6790	9	8 1/2	40	33	Y	4	1.8	2.2	3.2	4.1	2.5	12	40	Ovn	4-41 x 5	1200	45-1200	200-900	318	GKD	FM	Zen	Don	DC	Roc-SP	Ovn	SG	2-5	12(e)	8 1/2	960	DM
W M	56	101 1/2	57 1/2	56 1/2	6790	9	8 1/2	40	33	Y	4	1.8	2.2	3.2	4.1	2.5	12	40	Ovn	4-41 x 5	1200	45-1200	200-900	318	GKD	FM	Zen	Don	DC	Roc-SP	Ovn	SG	2-5	12(e)	8 1/2	960	DM
W M	56	101 1/2	57 1/2	56 1/2	6790	9	8 1/2	40	33	Y	4	1.8	2.2	3.2	4.1	2.5	12	40	Ovn	4-41 x 5	1200	45-1200	200-900	318	GKD	FM	Zen	Don	DC	Roc-SP	Ovn	SG	2-5	12(e)	8 1/2	960	DM
W M	56	101 1/2	57 1/2	56 1/2	6790	9	8 1/2	40	33	Y	4	1.8	2.2	3.2	4.1	2.5	12	40	Ovn	4-41 x 5	1200	45-1200	200-900	318	GKD	FM	Zen	Don	DC	Roc-SP	Ovn	SG	2-5	12(e)	8 1/2	960	DM
W M	56	101 1/2	57 1/2	56 1/2	6790	9	8 1/2	40	33	Y	4	1.8	2.2	3.2	4.1	2.5	12	40	Ovn	4-41 x 5	1200	45-1200	200-900	318	GKD	FM	Zen	Don	DC	Roc-SP	Ovn	SG	2-5	12(e)	8 1/2	960	DM
W M	56	101 1/2	57 1/2	56 1/2	6790	9	8 1/2	40	33	Y	4	1.8	2.2	3.2	4.1	2.5	12	40	Ovn	4-41 x 5	1200	45-1200	200-900	318	GKD	FM	Zen	Don	DC	Roc-SP	Ovn	SG	2-5	12(e)	8 1/2	960	DM
W M	56	101 1/2	57 1/2	56 1/2	6790	9	8 1/2	40	33	Y	4	1.8	2.2	3.2	4.1	2.5	12	40	Ovn	4-41 x 5	1200	45-1200	200-900	318	GKD	FM	Zen	Don	DC	Roc-SP	Ovn	SG	2-5	12(e)	8 1/2	960	DM
W M	56	101 1/2	57 1/2	56 1/2	6790	9	8 1/2	40	33	Y	4	1.8	2.2	3.2	4.1	2.5	12	40	Ovn	4-41 x 5	1200	45-1200	200-900	318	GKD	FM	Zen	Don	DC	Roc-SP	Ovn	SG	2-5	12(e)	8 1/2	960	DM
W M	56	101 1/2	57 1/2	56 1/2	6790	9	8 1/2	40	33	Y	4	1.8	2.2	3.2	4.1	2.5	12	40	Ovn	4-41 x 5	1200	45-1200	200-900	318	GKD	FM	Zen	Don	DC	Roc-SP	Ovn	SG	2-5	12(e)	8 1/2	960	DM
W M	56	101 1/2	57 1/2	56 1/2	6790	9	8 1/2	40	33	Y	4	1.8	2.2	3.2	4.1	2.5	12	40	Ovn	4-41 x 5	1200	45-1200	200-900	318	GKD	FM	Zen	Don	DC	Roc-SP	Ovn	SG	2-5	12(e)	8 1/2		

▼—Rated using rubber tires
 ■—Rated using gasoline
 ○—Others also
 *—Road speeds
 **—Ratings apply to regular models
 Also built as "I twin I"
 †—Special equipment
 ‡—Dimensions, power and are for steel wheel equipment
 (1)—Also built in wide track
 (2)—International Harvester

(3) —Also made in 4 speed model
(4) —Fate-Root-Heath Co.
(a) —12 to 20 in. widths available
(b) —12 to 20 in. widths available
(c) —15 to 28 in. widths available
AL —Auto-Lite
BB —Borg & Beck
Bos —Bosch Ignition
(c) —18 to 24 in. widths available
Cha —Chain
Co —Cone type
CS —Circulating splash
(d) —20 to 24 in. widths available

ABBREVIATIONS

D—Distillate
DC—Drilled Crankshaft
Del—Delco-Remy
DM—Driving Members
DO—Double Plate, in Oil
DOD—Diesel Oil or Distillate
Don—Donaldson
DP—Double Plate, dry
(c)—Also available in 10 in. diam.
Eis—Eisemann
ES—Edison-Splitdorf
(f)—Also available in 20 in. diam.

FK—Front Axle Knuckle
FM—Fairbanks Morse Co.
(g)—Bosch or Timken Injection systems
G—Gasoline
(h)—Also 444 R.P.M.
Here—Hercules
I—In Head (Valves)
IG—Internal Gear
(k)—Deco Injection system
K—Kerosene
Kin—Kingston

(I)—Dual
L—1/2" Head (Valves)
(m)—Steel wheels 2750 lbs., Rubber
tires 3480 lbs.
Mal—Mallory
MD—Multiple Dry Disk
Mo—Multiple Disk in Oil
MS—Marrel-Schiebler
(n)—Steel wheels 2635 lbs., Rubber
tires 3665 lbs.
N—No or None
NR—Not Rated

O—Diesel Fuel
Op—Optional
P—Steel wheels 5035 lbs., Rubber
tires 5450 lbs.
P—Frovs on either wheel
P—Steel wheels 4220 lbs., Rubber
tires 4620 lbs.
RF—Rotating Fork
S—Sprockets
SA—Swinging Axle
Sch—Schubler

SG-Spur Gear
SP-Single Plate, dry
TD-Twin-Disk
Til-Tilottson
Un-United
Var-Various widths
Vor-Vortex
WG-Worm Gear
Wi-Wico
Y-Yes
Zen-Zenith
ZK-Zenith or Kingston

AMERICAN STOCK CLUTCHES

MAKE AND MODEL	Designed For	Rated Torque Capacity (Lb. Ft.)	Type	Facing Material	DIAMETER OF FACING		Number of Facings	No. of Driving Members	No. of Driven Members	Disc or Plate Material	Number of Springs	PRESSURES (Lb.)				Overall Outside Diameter of Clutch (In.)	Flexible Hub Mounting	Type of Throwout Bearing	DRIVE TAKEN BY		Means of Adjustment	Is Clutch Brake Provided	Bell Housing (S. A. E. No.)	Weight Complete (Lb.)
					Outside (In.)	Inside (In.)						Total Spring Pressure	Total on Friction Face	Per Sq. In. of Friction Surface	To Disengage at Thru at Bearing				From Flywheel to Driving Members of Clutch	From Driven Members of Clutch to Clutch Shaft				
Borg & Beck 9A-7	C,T,Tr	(a)	SP	W-M	9 1/4	6	2	2	1	St	9	1215	1215	28.7	275	11 1/8	Sg	Opt	L.O.P.	Splines	No	No	5	16.00
Borg & Beck 9A-6	C,T,Tr	(a)	SP	W-M	9 1/4	5 5/8	2	2	1	St	9	1215	1215	28.7	275	11 1/8	Sg	Opt	L.O.P.	Splines	No	No	5	16.50
Borg & Beck 10A-7	C	210	SP	W-M	10	7	2	2	1	St	9	1395	1395	27.9	300	12 1/8	Sg	Opt	L.O.P.	Splines	No	No	5	19.35
Borg & Beck 10A-6	T,Tr	160	SP	W-M	10	6	2	2	1	St	12	1395	1395	27.9	300	12 1/8	Sg	Opt	L.O.P.	Splines	No	No	5	19.50
Borg & Beck 11A-6	C,T,B,Tr	(c)	SP	W-M	11	6 1/2	2	2	1	St	12	1770	1770	27.0	365	13 1/8	Sg	Opt	L.O.P.	Splines	No	No	4	28.50
Borg & Beck 12-Q & 12-QL	T,B,Tr	200	SP	Wo	11 1/2	7 1/4	2	2	1	St	1	300	1590	23.0	350	12 1/4	Sg	Opt	Pins	Splines	Sc	No	3	33.25
Borg & Beck 13-Q	T,B,Tr	260	SP	Wo	12 1/2	7 1/4	2	2	1	St	1	300	1590	17.8	350	13 1/4	No	Opt	Pins	Splines	Sc	No	3	41.25
Borg & Beck 14-Q	T,B,Tr	375	SP	Wo	13 1/2	7 1/4	2	2	1	St	1	350	2117	19.3	400	14 1/4	No	Opt	Pins	Splines	Sc	No	2	57.00
Brown-Lipe 12-SP	T,B,Tr	Var	SP	Wo	11 1/2	7 1/4	2	1	1	NI	1	Var	Var	Var	Var	13 1/4	Sg	BT	Keys	Splines	Shs	No	2.3,4	36.00
Brown-Lipe 13-SP	T,B,Tr	Var	SP	Wo	12 1/2	7 1/4	2	1	1	NI	1	Var	Var	Var	Var	14 1/4	Sg	BT	Keys	Splines	Shs	No	1.2,3	45.00
Brown-Lipe 14-SP	T,B,Tr	Var	SP	Wo	13 1/2	7 1/4	2	1	1	NI	2	Var	Var	Var	Var	15 1/4	Sg	AB	Keys	Splines	Th	Y	1.2,3	58.00
Brown-Lipe 13-2P	T,B,Tr	Var	DP	Wo	13	7 1/4	4	2	2	NI	2	Var	Var	Var	Var	15 1/4	No	AB	KP	Splines	Th	Y	1.2,3	84.00
Brown-Lipe 14-2P	T,B,Tr	Var	DP	Wo	13 3/4	7 1/4	4	2	2	NI	2	Var	Var	Var	Var	16 1/4	No	AB	KP	Splines	Th	Y	1.2	95.00
Hele-Shaw(1) 5	T,B	210	MO	No	7	6	15	14	BS	1	250	62.0	250	10 1/2	AB	Pins	Pins	Th	Y	Y	Y	Y	58.00	
Hele-Shaw(1) 6	T,B	300	MO	No	9	7	12	11	BS	1	300	56.0	300	12 1/4	AB	Pins	Pins	Th	Y	Y	Y	Y	82.00	
Hele-Shaw(1) 7	T,B	370	MO	No	9	7	15	14	BS	1	300	56.0	300	12 1/4	AB	Pins	Pins	Th	Y	Y	Y	Y	86.00	
Hele-Shaw(1) 8	T,B	420	MO	No	11 1/2	9 1/2	12	11	BS	1	400	38.0	400	15 1/2	AB	Pins	Pins	Th	Y	Y	Y	Y	110.00	
Hele-Shaw(1) 10	T,B	575	MO	No	11 1/2	9 1/2	16	15	BS	1	400	38.0	400	15 1/2	AB	Pins	Pins	Th	Y	Y	Y	Y	150.00	
Hele-Shaw(1) 150	T,B	1000	MO	No	17	15	17	16	BS	1	600	54.0	600	21 1/2	AB	Pins	Pins	Th	Y	Y	Y	Y	300.00	
Lipe, W.C. 234S	T,B,Tr	210	SP	W-M	11 1/2	7 1/4	2	1	1	SI	1	330	1750	25.0	390	13 1/4	Sg	BT	Lugs	Splines	Shs	No	3+	37.20
Lipe, W.C. 230S	T,B,Tr	270	SP	W-M	12 1/2	7 1/4	2	1	1	SI	1	360	2250	25.0	380	14 1/4	Sg	BT	Lugs	Splines	Shs	No	3+	45.07
Lipe, W.C. 232S	T,B,Tr	340	SP	W-M	13 1/2	7 1/4	2	1	1	SI	1	410	2650	23.4	400	15 1/4	Sg	BT	Lugs	Splines	Shs	No	3+	57.00
Lipe, W.C. 231S	T,Tr	425	SP	Wo	13 1/2	7 1/4	2	1	1	SI	1	465	3230	29.4	515	15 1/4	Sg	BT	Lugs	Splines	Shs	No	3+	60.50
Lipe, W.C. 242S	T,B,Tr	450	SP	Wo	15	8	2	1	1	SI	1	485	3150	24.0	575	16 1/4	Sg	BT	Lugs	Splines	Shs	No	2+	73.00
Lipe, W.C. 240S	T,B,Tr	615	SP	Wo	15	8	2	1	1	SI	1	600	4200	33.0	725	16 1/4	Sg	BT	Lugs	Splines	Shs	No	2+	75.00
Lipe, W.C. 240S	T,Tr	600	DP	Wo	12 1/2	7 1/4	4	2	2	SI	1	485	2420	27.2	575	15 1/4	No	BT	Lugs	Splines	Shs	No	2+	83.00
Lipe, W.C. 238S	T,Tr	1000	DP	Wo	15	8	4	2	2	SI	1	485	3712	29.0	575	16 1/4	No	BT	Lugs	Splines	Shs	No	2+	105.00
Long 7 1/2-CB	Cars	60	SP	W-M	7 1/2	5	2	2	1	St	6	Var	Var	Var	Var	8 1/2	Sg	BA	CS	Splines	No	No	6+	10.50
Long 8 1/2-CB	C.T	125	SP	W-M	8 1/2	6	2	2	1	St	6	Var	Var	Var	Var	9 1/2	Sg	BA	CS	Splines	No	No	6+	10.75
Long 9-CF	C.T	(g)	SP	W-M	9	5 3/4	2	2	1	St	6	Var	Var	Var	Var	11	Sg	BA	CS	Splines	No	No	5+	14.50
Long 9 1/2-CF	C.T	(h)	SP	W-M	9 1/2	6	2	2	1	St	6	Var	Var	Var	Var	11 1/2	Sg	BA	CS	Splines	No	No	5+	15.75
Long 10-CF	C,T,B,Tr	(d)	SP	W-M	10	6	2	2	1	St	9	Var	Var	Var	Var	12	Sg	BA	CS	Splines	No	No	5+	20.50
Long 11-CF	C,T,B,Tr	(e)	SP	W-M	11	6 1/2	2	2	1	St	9	Var	Var	Var	Var	13	Sg	BA	CS	Splines	No	No	4+	23.75
Long 12-CB	C,T,B,Tr	(f)	SP	W-M	12	7	2	2	1	St	12	Var	Var	Var	Var	14 1/2	Sg	BA	CS	Splines	No	No	3+	37.75
Long 29-A	T,Tr	225	DP	W-M	9 3/4	6 1/4	4	3	2	St	12	Var	Var	Var	Var	11 3/4	No	BA	Lugs	Splines	No	No	4+	33.00
Long 31-A	T,Tr	300	DP	W-M	11	6 1/2	4	3	2	St	12	Var	Var	Var	Var	13	No	BA	Lugs	Splines	No	No	4+	44.00
Long 34-BD	T,Tr	550	DP	W-M	13 1/4	7 1/4	4	3	2	St	18	Var	Var	Var	Var	16 1/4	No	BA	Lugs	Splines	No	No	2+	99.25
Long 13-B	T,B,Tr	350	SP	W-M	13 1/4	7 1/4	2	2	1	St	18	Var	Var	Var	Var	15 1/2	Sg	BA	CS	Splines	Sc	No	2+	63.50
Long 15-A	T,B,Tr	500	SP	W-M	15 1/2	9	2	2	1	St	18	Var	Var	Var	Var	17 1/4	Sg	BA	CS	Splines	Sc	No	1+	75.50
Long 17	T,B,Tr	600	SP	W-M	16 3/4	10	2	2	1	St	30	Var	Var	Var	Var	19 1/2	No	BA	CS	Splines	Sc	No	1+	96.00
Rockford 8-II	C,T	98	SP	W-M	7 7/8	5 1/2	2	1	1	St	6	720	720	27.6	213	9 1/2	Sg	Opt	Studs	Splines	SCL	No	4,5	.....
Rockford 9-II	T,B	145	SP	W-M	8 1/8	5 3/4	2	1	1	St	6	930	930	25.9	221	10 1/2	Sg	Opt	Studs	Splines	SCL	No	2,3,4,5	.....
Rockford 12-II	T,B,Tr	347	SP	W-M	11 1/8	6 1/2	2	1	1	St	9	1665	1665	22.6	420	13 1/2	Sg	Opt	Studs	Splines	SCL	No	2,3,4	.....
Rockford 14-II	T,B,Tr	590	SP	W-M	13 1/8	8	2	1	1	St	12	2460	2460	24.3	575	15 1/2	Sg	Opt	Studs	Splines	SCL	No	1,2,3	.....
Rockford 9-TT	T,B	210	SP	W-M	9	5 1/2	2	1	1	St	12	1350	1350	36.0	295	11 1/8	No	Opt	L.O.P.	Splines	Sc	No	2,3,4,5	.....
Rockford 10-TT	C,T,B,Tr	225	SP	W-M	9 1/2	6 1/2	2	1	1	St	12	1500	1500	32.0	350	12	No	Opt	L.O.P.	Splines	Sc	No	2,3,4,5	.....
Rockford 11-TT	C,T,B,Tr	320	SP	W-M	10 1/2	6 1/2	2	1	1	St	12	1740	1740	31.8	435	13	Sg	Opt	L.O.P.	Splines	Sc	No	2,3,4	.....
Rockford 12-TT	T,B,Tr	540	SP	W-M	11 1/2	6 1/2	2	1	1	St	15	2175	2175	35.0	435	14 1/2	Sg	Opt	L.O.P.	Splines	Sc	No	2,3,4	.....
Rockford 14-TT	T,B,Tr	635	SP	W-M	13 1/8	8	2	1	1	St	12	2100	2100	21.8	420	15 1/2	Sg	Opt	L.O.P.	Splines	Sc	No	1.2,3	.....
Rockford 15-TT	T,B,Tr	920	SP	W-M	15	8	2	1	1	St	18	3150	3150	25.0	630	16 1/2	Sg	BA	Studs	Splines	Sc	No	0.00	.....
Rockford 18-TT	T,B,Tr	1960	DP	Wo	17 1/2	9 5/8	4	2	2	St	16	3360	2360	19.5	570	21	No	AB	Studs	Splines	Sc	No	0.00	.....
Rockford 9-RM	T,B,Tr	115	SP	W-M	8 7/8	5 1/4	2	1	1	St	6	750	750	21.0	190	11 1/2	No	BA	L.O.P.	Splines	SCL	No	2,3,4,5	.....
Rockford 10-RM	T,B,Tr	175	SP	W-M	9 1/2	6 1/2	2	1	1	St	6	1020	1020	21.0	255	11 1/2	No	BA	L.O.P.	Splines	SCL	No	2,3,4,5	.....
Rockford 11-RM	T,B,Tr	310	SP	W-M	10 1/2	6 1/2	2	1	1	St	9	1665	1665	30.0	380	13 1/2	No	BA	L.O.P.	Splines	SCL	No	2,3,4	.....
Rockford 15-Q	T,B,Tr	690	SP	Wo	15	8	2	1	1	St	9	2880	2880	22.8	690	17 1/4	No	AB	L.O.P.	Splines	.....	No	1.2,3	.....
Twin Disc { C-minimum	Tr	75	↑	Wo	5 1/4	3 1/2	2	1	2	I	No	No	1380	50.0	50	7 1/2	No	Pla	GT	Splines	Th	No	.....	10.00
Twin Disc { C-maximum	Tr	1100	↑	Wo	14	7	4	2	3	St	No	No	5600	50.0	100	18 1/2	No	Pla	GT	Splines	Th	No	.....	110.00

ABBREVIATIONS

↑—Made with Single or Double Plate, operating Dry or in Oil
 +—And larger
 (1)—Merchant and Evans Co.
 (2)—Interstate Motive Parts Co.
 (a)—170 lbs. on Pass. Cars, 130 on Trucks and Tractors
 AB—Annular Ball
 B—Buses
 BA—Ball Thrust or Annular Ball
 BP—Ball or Plain Thrust
 BS—Bronze and Steel
 BT—Ball Thrust
 c)—265 lbs. on Pass. Cars, 195 on Trucks, Buses or Tractors
 C—Cars CI—Cast Iron

CS—Cap Screws
 (d)—Cars 225, Trucks 160, Buses and Tractors 130
 DP—Double Plate, dry
 (e)—Cars 275, Trucks 185, Buses and Tractors 170
 (f)—Cars 375, Trucks 250, Buses and Tractors 200
 (g)—Cars 165, Trucks 135
 GT—Gear Teeth
 (h)—Cars 185, Trucks 150
 I—Iron
 KP—Keys and Pins
 L.O.P.—Lugs on Pressure Plate
 MD—Multiple Disc, Dry
 MO—Multiple Disc, in Oil
 NI—Nickel Iron
 PL—Pins and Lugs
 Pla—Plain

Sc—Screws on Cover Plate
 SCL—Screws on Clutch Lever
 SD—Single and Double Plate
 Sg—Springs
 Shs—Shims
 SI—Special Iron
 SP—Single Plate, Dry
 Sr—Springs and Rubber
 SSP—Screws in Studs in Pressure Plate
 St—Steel
 T—Trucks
 Th—Threaded Ring
 Tr—Tractors
 Var—Various
 W-M—Woven or Molded
 Wo—Woven Y—Yes

AMERICAN STOCK, MARINE AND

Line Number	MAKE AND MODEL	Designed for	Number of Cylinders Bore and Stroke (In.)	Rated Hp. (A.M.A.)	Maximum Brake Hp. at Specified R.P.M.	Piston Displacement (Cu. In.)	Compression Ratio	Maximum Torque at R.P.M. (Lb. Ft.)	No. of Cylinders Cast in One Piece	Crankcase - Upper Half Integral with Cylinders	Arrangement	Exhaust Head Material or S.A.E. No.	VALVES								Seat Angle (Degrees)	
													Max. Head Diameter (In.)		Min. Port Diameter (In.)		Lift (In.)		Stem Diameter (In.)			
													Intake	Exhaust	Intake	Exhaust	Intake	Exhaust	Intake	Exhaust		
1	Allis-Chalmers	B-15	Tr, PU	4-3 1/2 x 3 1/2	16.9	22-1800	116.0	5.00	74-1100	W	In	I	Sil	1.43	1.31	1.18	1.00	.372	.372	.341	.341	45
2	Allis-Chalmers	W-25	Tr, PU	4-4 x 4	25.6	31-1300	201.0	5.00	130-1150	W	W	I	Sil	1.68	1.50	1.50	1.31	.372	.372	.372	.372	45
3	Allis-Chalmers	U-40	Tr, PU	4-4 1/2 x 5	32.4	45-1200	318.0	4.75	200-900	W	In	I	Sil	2.03	1.78	1.75	1.50	.375	.375	.373	.373	30
4	Allis-Chalmers	E-60	Tr, PU	4-5 1/2 x 6 1/2	44.1	68-1050	563.0	4.50	370-750	W	Se	I	Sil	2.21	2.21	2.00	2.00	.437	.415	.434	.434	45
5	Allis-Chalmers	L-90	Tr, PU	6-5 1/2 x 6 1/2	66.1	102-1050	844.0	4.50	550-725	W	W	I	Sil	2.21	2.21	2.00	2.00	.437	.415	.434	.434	45
6	Autocar	315	T	6-3 3/4 x 4 3/4	33.7	81-2400	315.0	5.50	220-800	6	Se	L	Sil	1.75	1.65	1.56	1.43	.375	.375	.437	.437	45
7	Autocar	358	T	6-4 x 4 1/2	38.4	89-2400	358.0	5.50	248-900	6	Se	L	Sil	1.90	1.78	1.68	1.53	.375	.375	.437	.437	45
8	Autocar	408	T	6-4 1/2 x 5 1/2	39.6	110-2400	408.0	5.50	293-900	6	Se	L	Sil	2.06	1.93	1.87	1.75	.375	.375	.437	.437	45
9	Autocar	447	T	6-4 1/2 x 5 1/2	43.4	116-2400	447.0	5.50	331-800	6	Se	L	Sil	2.06	1.93	1.87	1.87	.375	.375	.437	.437	45
10	Autocar	501	T	6-4 1/2 x 5 1/2	48.6	124-2300	501.0	5.50	380-800	6	Se	L	Sil	2.06	2.06	1.87	1.75	.375	.375	.437	.437	45
11	Brennan	Imp.	C, T, Tr	4-2.2x3	7.8	20-3800	45.6	5.00	34-1800	4	Se	L	Sil	1.00	1.00			.250	.250	.312	.312	30
12	Brennan	Imp.	M	4-2.2x3	7.8	20-3800	45.6	7.00	34-1800	4	Se	L	Sil	1.00	1.00	.875	.875	.250	.250	.312	.312	30
13	Brennan	E4	M	4-4x5		40-2000	251.0	5.00	160-1000	4	Se	CI	Sil	2.00	2.00	1.87	1.87	.375	.375	.375	.375	45
14	Brennan	CE	T, Tr	4-4 1/2 x 5	32.4	55-1800	318.0	4.06	225-1000	4	Se	L	Sil	2.00	2.00	1.87	1.87	.375	.375	.375	.375	45
15	Brennan	B70	T, B, Tr	6-4x5 1/2	38.4	70-1800	414.7	4.50	250-800	3	Se	L	Sil	2.12	2.12			.375	.375	.437	.437	45
16	Brennan	90	M	6-4x5 1/2		100-2200	414.7	6.00	270-900	3	Se	L	Sil	2.12	2.12	2.00	2.00	.375	.375	.437	.437	45
17	Brennan	125	M	6-4x5 1/2		125-2000	496.0	6.00	325-1000	3	Se	L	Sil	2.12	2.12	2.00	2.00	.375	.375	.437	.437	45
18	Brennan	100	T, B, Tr	6-4x5 1/2	45.9	75-1800	496.0	4.50	320-800	3	Se	L	Sil	2.12	2.12			.375	.375	.437	.437	45
19	Brennan	150	M	6-4x5 1/2		150-2000	620.3	5.00	510-1400	3	Se	L	Sil	2.50	2.50			.437	.437	.500	.500	45
20	Brennan	150	T, B, Tr	6-4x5 1/2	48.6	150-2000	620.3	5.00	510-1400	3	Se	L	Sil	2.50	2.50			.437	.437	.500	.500	45
21	Bridgeport	F-5	M	1-3 1/2 x 4 1/2		6-1200	99.0			1	In	NS		1.43	1.43							
22	Bridgeport	F-10	M	2-3 1/2 x 4 1/2		12-1200	99.0			2	In	NS		1.43	1.43							
23	Bridgeport	F-20	M	4-2 1/2 x 4		25-2500	95.0			4	In	CNS		1.12	1.12							45
24	Bridgeport	F-25	M	4-3 1/2 x 3 1/2		50-2500	134.0			4	In	CNS		1.37	1.25			.312	.312			45
25	Bridgeport	Pilot	M	4-4 1/2 x 5		55-2000	283.0			4	In	NS		1.62	1.62							45
26	Bridgeport	Pilot	M	6-4 1/2 x 4 1/2		80-2000	428.0			6	In	L	Sil	1.75	1.75							45
27	Buda	HP-205	T, Tr	4-3 1/2 x 4 1/2	23.2	51-2400	205.0	4.76	132-1200	4	In	L	2112	1.65	1.53	1.50	1.37	.344	.344	.372	.372	45
28	Buda	HP-217	T, Tr	4-3 1/2 x 4 1/2	23.2	54-2400	217.0	5.00	146-1200	4	In	L	2112	1.65	1.53	1.50	1.37	.344	.344	.372	.372	45
29	Buda	HM-217	M	4-3 1/2 x 4 1/2	23.2	54-2400	217.0	5.00	146-1200	4	In	L	2112	1.65	1.53	1.50	1.37	.344	.344	.372	.372	45
30	Buda	KT-281	Tr	4-4 1/2 x 5 1/2	27.2	49-1750	281.0	4.50	173-1000	4	Se	L	Sil	1.87	1.87	1.62	1.62	.231	.312	.372	.372	45
31	Buda	YT-381	T, B, Tr	4-4 1/2 x 6	32.4	50-1400	381.7	4.10	222-850	4	Se	L	2112	2.37	2.37	2.12	2.12	.312	.312	.434	.434	45
32	Buda	YR-425	T	4-4 1/2 x 6	36.0	57-1400	425.3	3.80	264-700	4	Se	L	2112	2.37	2.37	2.12	2.12	.312	.312	.434	.434	45
33	Buda	BTU	T, B, Tr	4-5 1/2 x 6 1/2	40.0	61-1200	510.5	4.65	330-650	4	Se	L	2112	2.50	2.50	2.25	2.25	.375	.375	.434	.434	45
34	Buda	FR	T, B, Tr	4-5 1/2 x 6 1/2	48.5	78-1200	618.0	4.60	405-650	4	Se	L	2112	2.50	2.50	2.25	2.25	.375	.375	.434	.434	45
35	Buda	JV-4	Tr, Ind	4-5 1/2 x 7 1/2	52.9	85-1200	740.0	3.85	472-750	2	Se	L	2112	2.75	2.78	2.50	2.50	.375	.375	.497	.497	30
36	Buda	JK-4	Tr, Ind	4-6 1/2 x 7 1/2	57.6	115-1200	806.0	4.70	560-700	2	Se	L	2112	2.93	2.93	2.50	2.50	.375	.375	.497	.497	30
37	Buda	JL-877	Tr, Ind	4-6 1/2 x 7 1/2	62.5	108-1000	874.0	4.60	645-650	2	Se	L	2112	2.93	2.93	2.50	2.50	.375	.375	.497	.497	30
38	Buda	JP-260	T, B	6-3 1/2 x 4 1/2	29.4	68-2800	260.0	4.75	165-1200	6	In	L	2112	1.65	1.53	1.50	1.37	.344	.344	.372	.372	45
39	Buda	HM-260	M	6-3 1/2 x 4 1/2	29.4	70-2800	260.0	5.25	183-1000	6	In	L	2112	1.65	1.53	1.50	1.37	.344	.344	.372	.372	45
40	Buda	HM-260-R	M	6-3 1/2 x 4 1/2	33.7	70-2800	260.0	5.25	183-1000	6	In	L	2112	1.65	1.53	1.50	1.37	.344	.344	.372	.372	45
41	Buda	HP-298	T, B, Tr	6-3 1/2 x 4 1/2	33.7	77-2800	298.0	4.75	190-1100	6	In	L	2112	1.65	1.53	1.50	1.37	.344	.344	.372	.372	45
42	Buda	HP-326	T, B, Tr	6-3 1/2 x 4 1/2	34.8	78-2400	326.0	5.35	218-1000	6	In	L	2112	1.65	1.53	1.50	1.37	.344	.344	.372	.372	45
43	Buda	HM-326	M	6-3 1/2 x 4 1/2	34.8	78-2400	326.0	5.35	218-1000	6	In	L	2112	1.65	1.53	1.50	1.37	.344	.344	.372	.372	45
44	Buda	HM-326-R	M	6-3 1/2 x 4 1/2	34.8	78-2400	326.0	5.35	218-1000	6	In	L	2112	1.65	1.53	1.50	1.37	.344	.344	.372	.372	45
45	Buda	K-359	T, B	6-4 1/2 x 4 1/2	39.6	99-2800	369.0	4.73	234-1100	6	In	L	2112	1.90	1.78	1.75	1.62	.400	.400	.372	.372	45
46	Buda	K-393	T, B, Tr	6-4 1/2 x 4 1/2	42.0	101-2400	428.0	5.33	302-1000	6	In	L	2112	1.90	1.78	1.75	1.62	.400	.400	.372	.372	45
47	Buda	K-428	T, B, Tr	6-4 1/2 x 4 1/2	45.9	107-2400	428.0	5.25	280-1200	6	In	L	2112	1.90	1.78	1.75	1.62	.400	.400	.372	.372	45
48	Buda	KM-428	M	6-4 1/2 x 4 1/2	48.6	105-2400	428.0	5.25	280-1200	6	In	L	2112	1.90	1.78	1.75	1.62	.400	.400	.372	.372	45
49	Buda	KM-428-R	M	6-4 1/2 x 4 1/2	48.6	105-2400	428.0	5.25	280-1200	6	In	L	2112	1.90	1.78	1.75	1.62	.400	.400	.372	.372	45
50	Buda	LM-525	T, B, Tr	6-4 1/2 x 5 1/2	48.6	110-2400	525.0	4.75	340-800	6	In	L	2112	1.90	1.78	1.75	1.62	.400	.400	.372	.372	45
51	Buda	LM-525-R	M	6-4 1/2 x 5 1/2	48.6	121-2200	525.0	5.20	364-800	6	In											

COMMERCIAL VEHICLE ENGINES

Front End Drive—Type	PISTONS				Number of Rings per Piston	CONNECTING RODS		CRANKSHAFT				SPARK PLUG		CARBU-RETOR		Adapted for Use of Kerosene or Distillate	Weight (Without Carburetor or Ignition)—Lb.	OVERALL DIMENSIONS (In.)			Line Number				
	Material	Length (In.)	Weight (with Pins, Rings and Bushing) (Oz.)	Piston Pin Diameter and Length (In.)		Material	Center to Center Length (In.)	Weight With Bushing and Cap (Oz.)	Material	Counterbalances Used	Crank-pin Diameter and Length (In.)	Main Bearings		Oil Pressure To Recommended Make	Thread Size			Make	Size	Width		Height	Length		
												Number	Front											Rear	
																									Diameter and Length (In.)
HG	CI	3.68	40.0	.813x2.87	3	CS	6 1/2	32	CS	N	1.93x1.25	3	2.25x1.50	2.25x1.50	aceg	CA	14 mm.	Zen	3 1/2	K-D	360	16 1/2	23 1/2	26 1/2	1
HG	CI	4.43	61.0	.989x3.50	4	CS	7 1/2	42	CS	N	2.35x1.54	3	2.41x1.59	2.46x1.75	abceq	CA	14 mm.	Zen	1	K-D(5)	425	19 1/2	31 1/2	33 1/2	2
HG	CI	5.25	80.0	1.31x4.06	4	CS	9 1/2	92	CS	N	2.37x2.37	3	2.50x2.31	2.50x2.74	abceq	CA	1 1/2-18	Zen	1 1/2	K-D(5)	980	26 1/2	36 1/2	43 1/2	3
HG	CI	6.75	158.0	1.50x4.87	4	CS	13	176	CS	N	2.75x3.25	3	3.00x3.50	3.00x4.74	abceq	CA	1 1/2-18	Zen	1 1/2	K-D(5)	1830	27 1/2	44 1/2	57 1/2	4
HG	CI	6.75	158.0	1.50x4.87	4	CS	13	176	CS	N	2.75x3.25	4	3.00x3.50	3.00x4.74	abceq	CA	1 1/2-18	Zen	1 1/2	K-D(5)	2870	29 1/2	51 1/2	72 1/2	5
HG	Ala	4.87	36.0	1.12x3.18	4	AS	10 1/4	73	CS	N	2.25x1.44	7	3.00x1.87	3.00x2.62	abceq	CH	18 mm.	Str	1 1/2	No	1155	27 1/2	30 1/2	42 1/2	6
HG	Ala	4.87	43.0	1.12x3.43	4	AS	10 1/4	73	CS	N	2.25x1.44	7	3.00x1.87	3.00x2.62	abceq	CH	1 1/2-18	Str	1 1/2	No	1165	27 1/2	30 1/2	42 1/2	7
HG	Ala	5.75	45.0	1.12x3.43	4	AS	10 1/4	88	CS	N	2.50x1.58	7	3.25x1.87	3.25x2.87	abceq	CH	18 mm.	Str	1 1/2	No	1355	27 1/2	31 1/2	45 1/2	8
HG	Ala	5.75	51.0	1.12x3.68	4	AS	10 1/4	88	CS	N	2.50x1.58	7	3.25x1.87	3.25x2.87	abceq	CH	18 mm.	Str	1 1/2	No	1355	27 1/2	31 1/2	45 1/2	9
HG	Ala	5.75	57.0	1.12x3.93	4	AS	10 1/4	88	CS	N	2.50x1.58	7	3.25x1.87	3.25x2.87	abceq	CH	18 mm.	Str	1 1/2	No	1360	27 1/2	31 1/2	45 1/2	10
HG	Al	2.62	62.5x2.00	3	AS	7	7	7	CNS	Y	1.37x1.25	2	ball	roller	abce	CA	1 1/2	Til	3 1/2	No	130	13 1/2	18	20	11
HG	Al	2.62	62.5x2.00	3	AS	7	7	7	CNS	Y	1.37x1.25	2	ball	roller	bce	CH	1 1/2	TZ	3 1/2	No	160	8 1/2	12	29	12
SG	CI	5.00	1.17x4.00	4	AS	11	64	64	CNS	N	2.50x2.00	3	2.12x4.25	2.12x2.25	abceq	CA	1 1/2	Str	1 1/2	K-D	650	12 1/2	19 1/2	53 1/2	13
SG	SS	5.00	72.0	1.17x4.00	5	AS	11	64	NS	N	2.50x2.50	3	2.50x4.25	2.50x3.50	abceq	CA	1 1/2	Str	1 1/2	K-D	950	16	18	53	14
SG	SS	5.00	72.0	1.17x4.00	5	AS	11	64	NS	N	2.50x2.50	3	2.50x4.25	2.50x3.50	abceq	CA	1 1/2	Str	1 1/2	K-D	650	21	29 1/2	37 1/2	15
HG	SS	4.50	64.0	1.17x3.87	4	CS	9 1/2	42	CNS	Y	2.50x2.00	3	2.75x4.50	2.75x3.00	abce	CA	1 1/2	Str	1 1/2	K-D	800	25 1/2	33 1/2	49 1/2	16
HG	SS	4.50	64.0	1.17x3.87	4	CS	9 1/2	42	CNS	Y	2.50x2.00	3	2.75x4.50	2.75x3.00	abceq	CA	1 1/2	Str	1 1/2	K-D	750	19 1/2	24 1/2	65	17
HG	SS	4.50	76.0	1.25x3.87	5	AS	11	80	CNS	Y	2.50x2.00	3	2.75x4.50	2.75x3.00	abceq	CA	1 1/2	Str	1 1/2	D	900	19 1/2	24 1/2	65	18
HG	SS	4.50	70.0	1.25x3.87	5	AS	11	80	CNS	Y	2.50x2.00	3	2.75x4.50	2.75x3.00	abce	CA	1 1/2	Str	1 1/2	K-D	875	25 1/2	33 1/2	49 1/2	19
BG	SS	5.00	72.0	1.37x4.00	5	AS	12	80	CNS	N	2.62x2.62	7	2.62x5.00	2.62x3.50	abceq	CA	1 1/2	Str	1 1/2	K-D	1450	20	30	74	20
BG	SS	5.00	72.0	1.37x4.00	5	AS	12	80	CNS	N	2.62x2.62	7	2.62x5.00	2.62x3.50	abceq	CA	1 1/2	Str	1 1/2	K-D	1000	22	40	54	21
SG	CI	4.00	58.0	.750x3.62	3	CS	9	60	CS	Y	1.37x2.00	2	1.37x2.50	1.37x2.50	Splash	1 1/2-18	Zen	1	D	155	14	22 1/2	21	22	
SG	CI	4.00	58.0	.750x3.62	3	CS	9	60	CNS	Y	1.37x2.00	2	1.50x3.00	1.50x3.00	Splash	1 1/2-18	Zen	1	D	320	14	22 1/2	21	22	
HG	CI	3.25	41.0	.625x2.62	3	CS	9	47	CS	N	1.50x1.75	3	2.75x1.50	2.75x1.50	abce	1 1/2-18	Zen	1 1/2	No	397	17	22	35	24	
HG	Al	3.50	50.0	.750x3.12	3	AS	9 1/2	50	CNS	N	1.75x1.50	3	1.87x2.00	1.87x1.50	abce	1 1/2-18	Zen	1 1/2	No	460	20	22 1/2	36	25	
HG	CI	4.00	59.0	1.37x4.12	3	AS	9 1/2	60	CNS	N	2.00x2.25	3	2.00x2.75	2.00x1.12	abce	1 1/2-18	Zen	1 1/2	No	950	20	28	53	26	
HG	SS	3.75	42.0	1.12x3.22	4	CS	9 1/2	42	CS	N	2.12x1.62	5	3.00x1.50	3.00x2.12	abceq	1 1/2-18	Zen	1 1/2	No	1650	18	31	62	27	
HG	SS	3.75	42.0	1.12x3.22	4	CS	9 1/2	42	CS	N	2.12x1.62	5	3.00x1.50	3.00x2.12	abceq	1 1/2-18	Zen	1 1/2	No	590	26	29	31	28	
HG	SS	3.75	42.0	1.12x3.22	4	CS	9 1/2	42	CS	N	2.12x1.62	5	3.00x1.50	3.00x2.12	abceq	1 1/2-18	Zen	1 1/2	No	590	25 1/2	31	38	29	
HG	SS	3.75	42.0	1.12x3.22	4	CS	9 1/2	42	CS	N	2.12x1.62	5	3.00x1.50	3.00x2.12	abceq	1 1/2-18	Str	1 1/2	No	770	23 1/2	31	43 1/2	30	
HG	SS	3.75	42.0	1.12x3.22	4	CS	9 1/2	42	CS	N	2.12x1.62	5	3.00x1.50	3.00x2.12	abceq	1 1/2-18	Str	1 1/2	No	830	23 1/2	31	51	31	
HG	CI	5.00	65.0	1.50x3.31	4	CS	11 1/4	89	CS	N	2.00x2.25	3	1.87x2.87	2.12x3.44	abceq	1 1/2-18	Zen	1 1/2	No	875	25 1/2	33 1/2	40	32	
HG	CI	6.25	97.0	1.25x3.87	4	CS	13 1/4	122	CS	N	2.25x3.00	3	2.12x3.31	2.37x4.44	abceq	1 1/2-18	Zen	1 1/2	No	1087	25 1/2	36 1/2	47 1/2	33	
HG	CI	6.12	111.0	1.43x4.11	4	AS	13 1/4	106	CS	N	2.50x2.87	3	2.50x3.00	2.50x4.50	abceq	1 1/2-18	Zen	1 1/2	No	1087	25 1/2	36 1/2	47 1/2	34	
HG	CI	6.75	142.0	1.37x4.37	4	AS	14 1/4	163	CS	N	2.50x3.12	3	2.25x4.12	2.62x4.69	abceq	1 1/2-18	Zen	1 1/2	No	1409	28 1/2	40	52	35	
HG	CI	6.75	144.0	1.37x4.87	4	AS	14 1/4	163	CS	N	2.50x3.12	3	2.25x4.12	2.62x4.69	abceq	1 1/2-18	Zen	1 1/2	No	1430	28 1/2	40	52	36	
HG	CI	6.87	172.0	2.00x4.87	4	AS	14 1/4	252	CS	N	3.00x3.31	3	3.00x4.75	3.00x4.75	abceq	1 1/2-18	Zen	1 1/2	No	1925	30	47	58 1/2	37	
HG	CI	6.87	172.0	2.00x5.12	4	AS	14 1/4	252	CS	N	3.00x3.31	3	3.00x4.75	3.00x4.75	abceq	1 1/2-18	Zen	1 1/2	No	1925	30	44	58 1/2	38	
HG	CI	6.87	199.0	2.00x5.33	4	AS	14 1/4	227	CS	N	3.00x3.31	3	3.00x4.75	3.00x4.75	abceq	1 1/2-18	Zen	1 1/2	No	1925	30	40	58 1/2	39	
HG	CI	3.75	37.0	1.12x2.97	4	CS	9 1/2	42	CS	N	2.12x1.62	7	3.00x1.50	3.00x2.12	abceq	1 1/2-18	Zen	1 1/2	No	825	25 1/2	33	39	40	
HG	CI	3.75	37.0	1.12x2.97	4	CS	9 1/2	42	CS	N	2.12x1.62	7	3.00x1.50	3.00x2.12	abceq	1 1/2-18	Str	1 1/2	No	990	22 1/2	28	54 1/2	41	
HG	CI	3.75	37.0	1.12x2.97	4	CS	9 1/2	42	CS	N	2.12x1.62	7	3.00x1.50	3.00x2.12	abceq	1 1/2-18	Str	1 1/2	No	1050	22 1/2	28	60	42	
HG	CI	3.75	42.0	1.12x3.25	4	CS	9 1/2	42	CS	N	2.12x1.62	7	3.00x1.50	3.00x2.12	abceq	1 1/2-18	Zen	1 1/2	No	825	25 1/2	33	39	43	
HG	Al	3.75	42.0	1.12x3.25	4	CS	9 1/2	42	CS	N	2.12x1.62	7	3.00x1.50	3.00x2.12	abceq	1 1/2-18	Zen	1 1/2	No	885	25 1/2	33	39	44	
HG	Al	3.75	42.0	1.12x3.25	4	CS	9 1/2	42	CS	N	2.12x1.62	7	3.00x1.50	3.00x2.12	abceq	1 1/2-18	Str	1 1/2	No	885	25 1/2	33	39	45	
HG	Al	3.75	42.0																						

AMERICAN STOCK, MARINE AND

Line Number	MAKE AND MODEL	Designed for	Number of Cylinders Bore and Stroke (In.)	Rated Hp. (A.M.A.)	Maximum Brake Hp. at Specified R.P.M.	Piston Displacement (Cu. In.)	Compression Ratio	Maximum Torque at R.P.M. (Lb. Ft.)	No. of Cylinders Cast in One Piece	Upper Half Crankcase Integral with Cylinders	Arrangement	Exhaust Head Material or S.A.E. No.	VALVES								Seat Angle (Degrees)	
													Max. Head Diameter (In.)		Min. Port Diameter (In.)		Lift (In.)		Stem Diameter (In.)			
													Intake	Exhaust	Intake	Exhaust	Intake	Exhaust	Intake	Exhaust		
1	Continental	Y-4091	C, T, Tr, Ind	4-2 1/2 x 3 1/2	13.2	36-3300	90.9	6.00	66-1300	4	In	L	XCR	1.20	1.01	1.06	.875	.291	.292	.314	.312	(h)
2	Continental	F-4124	C, T, Tr, Ind	4-3 x 4 1/2	14.4	47.5-3300	123.7	6.00	94-1600	4	In	L	XCR	1.51	1.32	1.37	1.18	.281	.290	.341	.339	(h)
3	Continental	F-4140	C, T, Tr, Ind	4-3 1/2 x 4 1/2	16.3	52-3250	139.6	6.00	106-1600	4	In	L	XCR	1.51	1.32	1.37	1.18	.281	.280	.341	.339	(h)
4	Continental	F-4162	C, T, Tr, Ind	4-3 1/2 x 4 1/2	18.9	58.5-3300	162.4	5.76	122-1600	4	In	L	XCR	1.51	1.32	1.37	1.18	.281	.280	.341	.339	(h)
5	Continental	OS-6202	T, Tr, Ind	6-3 1/2 x 4 1/2	23.4	70-3200	201.3	6.46	152-1200	6(1)	In	L	Sil	1.54	1.20	1.37	1.09	.390	.390	.373	.371	(h)
6	Continental	F-6170	C, T, Ind	6-3 x 4	21.6	65-3500	169.6	6.60	124-1200	6	In	L	XCR	1.51	1.32	1.37	1.18	.284	.284	.341	.339	(h)
7	Continental	F-6199	C, T, Ind	6-3 1/2 x 4	25.4	68.5-3400	199.1	6.00	150-1200	6	In	L	XCR	1.51	1.32	1.37	1.18	.284	.284	.341	.339	(h)
8	Continental	F-6209	C, T, Ind	6-3 1/2 x 4 1/2	24.4	71-3100	209.5	5.75	154-1200	6	In	L	XCR	1.51	1.32	1.37	1.18	.284	.284	.341	.339	(h)
9	Continental	F-6218	C, T, Ta, Ind	6-3 1/2 x 4 1/2	25.4	73.5-3100	217.8		161-1250	6	In	L	XCR	1.51	1.32	1.37	1.18	.284	.284	.341	.339	(h)
10	Continental	A-6244	C, T, B, Ta, Ind	6-3 1/2 x 4 1/2	28.3	83.5-3000	243.6	5.40	178-1200	6	In	L	XCR	1.57	1.42	1.43	1.31	.311	.311	.339	.338	(h)
11	Continental	M-6271	T, B, Tr, Ind	6-3 1/2 x 4 1/2	31.5	85-2600	270.9	5.70	190-1200	6	In	L	XCR	1.76	1.51	1.62	1.37	.354	.354	.404	.402	(h)
12	Continental	M-6290	T, B, Ind	6-3 1/2 x 4 1/2	33.7	88-2750	289.9	5.70	205-1200	6	In	L	XCR	1.76	1.51	1.62	1.37	.354	.354	.404	.402	(h)
13	Continental	M-6330	T, B, Ind	6-4 x 4 1/2	38.4	98.5-2750	329.9	5.50	233-1200	6	In	L	XCR	1.76	1.51	1.62	1.37	.354	.354	.404	.402	(h)
14	Continental	E-600	T, B, Ind	6-3 1/2 x 4 1/2	32.6	78-2650	288.3	5.43	192-900	6	In	L	XCR	2.06	1.87	1.81	1.62	.406	.378	.434	.432	30
15	Continental	E-601	T, B, Ind	6-3 1/2 x 4 1/2	35.0	86-2600	318.4	5.48	214-900	6	In	L	XCR	2.06	1.87	1.81	1.62	.406	.378	.434	.432	30
16	Continental	E-602	T, B, Ind	6-4 1/2 x 4 1/2	40.8	95.5-2550	360.8	5.40	252-900	6	In	L	XCR	2.06	1.87	1.81	1.62	.406	.378	.434	.432	30
17	Continental	E-603	T, B, Ind	6-4 1/2 x 4 1/2	43.3	98-2400	383.0	5.29	265-1000	6	In	L	XCR	2.06	1.87	1.81	1.62	.406	.378	.434	.432	30
18	Continental	20R	T, B, Ind	6-4 1/2 x 4 1/2	40.8	106-2500	380.9	4.75	276-1200	6	In	I	AUS	2.06	1.87	1.81	1.62	.420	.420	.434	.433	30
19	Continental	21R	T, B, Ind	6-4 1/2 x 4 1/2	45.9	118-2550	428.4	4.63	308-1200	6	In	I	AUS	2.06	1.87	1.81	1.62	.420	.420	.434	.433	30
20	Continental	22R	T, B, Ind	6-4 1/2 x 5 1/2	48.6	138-2400	501.0	4.50	354-1200	6	In	I	AUS	2.06	1.87	1.81	1.62	.420	.420	.434	.433	30
21	Dodge	TD	T	6-3 1/2 x 4 1/2	25.3	77-3000	217.7	6.50	158-1200	6	In	L	Sil	1.46	1.46	1.31	1.31	.312	.312	.340	.340	45
22	Dodge	TE	T	6-3 1/2 x 4 1/2	27.3	73-3000	218.0	5.80	150-1200	6	In	L	Sil	1.65	1.53	1.50	1.37	.343	.343	.340	.340	45
23	Dodge	TF	T	6-3 1/2 x 4 1/2	27.3	78-3000	228.1	5.80	158-1200	6	In	L	Sil	1.65	1.53	1.50	1.37	.343	.343	.340	.340	45
24	Dodge	TG-TK	T	6-3 1/2 x 4 1/2	27.3	85-3000	241.5	5.60	175-1200	6	In	L	Tun	1.65	1.53	1.50	1.37	.343	.343	.340	.340	45
25	Dodge	TL-TK	T	6-3 1/2 x 5	33.7	100-2800	331.3	5.20	230-800	6	In	L	Tun	1.93	1.75	1.78	1.59	.312	.312	.371	.371	45
26	Elco	F-42	M	4-5 x 6		90-1600	471.0	5.00	325-1050	2	Se	F	Sil	2.50	2.50	2.25	2.25	.303	.350	.437	.437	45
27	Elco	F-62	M	4-5 x 6		145-1600	707.0	5.00	490-1050	2	Se	F	Sil	2.50	2.50	2.25	2.25	.303	.350	.437	.437	45
28	Fay & Bowen	Go Best LN-403	M	4-3 x 4		20-1800	113.0			4	In	L	CNS									
29	Fay & Bowen	LC-41	M	4-3 1/2 x 4 1/2		27-1600	173.0			4	In	L	CNS									
30	Fay & Bowen	Rocket	M	4-2 1/2 x 3 1/2		35-3200	90.0			4	Se	L	CNS									
31	Fay & Bowen	LN-43	M	4-4 1/2 x 5 1/2		40-1000	369.8			4	Se	L	CNS									
32	Fay & Bowen	LC-61	M	6-3 1/2 x 4 1/2		55-2000	257.7			6	In	L	CNS									
33	Fay & Bowen	LNS-43	M	4-4 1/2 x 5 1/2		60-1400	398.8			4	Se	L	CNS									
34	Fay & Bowen	Challenger	M	6-3 1/2 x 4		60-2800	215.0			6	In	L	CNS									
35	Fay & Bowen	B	M	6-3 1/2 x 5		70-2200	331.5			6	In	L	CNS									
36	Fay & Bowen	Conqueror	M	6-4 1/2 x 4 1/2		100-2100	453.0			3	Se	L	CNS									
37	Ford	6CHP	C, T	8-2.60x3.20	21.6	60-3500	136.0	6.60	94-2500	8	In	L	CNS	1.28	1.28			.251	.251	.279	.279	45
38	Ford	85HP	C, T, B	8-3.06x3.75	30.0	85-3800	221.0	6.15	150-2000	8	In	L	CNS	1.53	1.53			.292	.292	.311	.311	45
39	Ford	95HP	C, T	8-3.18x3.75	32.5	95-3600	239.0	6.15	170-2100	8	In	L	CNS	1.53	1.53			.292	.292	.311	.311	45
40	Franklin	6AH-377	T, B, Tr, Ind	6-4 x 5	38.4	104-2500	377.0	4.90	250-1500	1	Se	I	CNS	1.75	1.43	1.62	1.31	.375	.375	.375	.375	30
41	Franklin	6A-377	T, B, Tr, Ind	6-4 x 5	38.4	104-2500	377.0	4.90	250-1500	1	Se	I	CNS	1.75	1.43	1.62	1.31	.375	.375	.375	.375	30
42	Franklin	6AH-400	T, B, Tr, Ind	6-4 1/2 x 5	40.8	110-2500	400.0	5.00	268-1500	1	Se	I	CNS	1.75	1.43	1.62	1.31	.375	.375	.375	.375	30
43	Franklin	6A-400	T, B, Tr, Ind	6-4 1/2 x 5	40.8	110-2500	400.0	5.00	268-1500	1	Se	I	CNS	1.75	1.43	1.62	1.31	.375	.375	.375	.375	30
44	Franklin	4CHO-150	T, Tr	4-3 1/2 x 3 1/2	30.4	43-3000	150.0	5.50	100-1200	1	Se	I	CNS	1.66	1.51	1.50	1.40	.375	.375	.375	.375	30
45	G. M. C.	226	T	6-3 1/2 x 3 1/2	30.4	78-3000	228.0	6.15	179-1000	6	In	L	Sil	1.64	1.46	1.25	1.15	.289	.307	.343	.343	30
46	G. M. C.	248	T	6-3 1/2 x 3 1/2	33.1	89-3000	248.5	6.15	195-1100	6	In	L	Sil	1.64	1.46	1.25	1.15	.289	.307	.343	.343	30
47	G. M. C.	278	T	6-3 1/2 x 4 1/2	31.5	100-2900	278.6	6.00	223-1200	6	Se	I	CHS	1.81	1.55	1.43	1.37	.333	.333	.375	.375	45
48	G. M. C.	308	T, B	6-3 1/2 x 4 1/2	33.8	110-2800	308.2	6.00	240-1200	6	Se	I	CHS	1.81	1.55	1.43	1.37	.333	.333	.375	.375	45
49	G. M. C.	361	T	6-4 1/2 x 4 1/2	40.8	122-2800	360.8	6.00	278-800	6	Se	I	CHS	1.93	1.71	1.50	1.50	.406	.406	.375	.375	(h)
50	G. M. C.	426	T	6-4 1/2 x 5	43.3	145-2700	425.5	6.00	340-1100	6	Se	I	CHS	1.93	1.71	1.50	1.50	.406	.406	.375	.375	(h)
51	G. M. C.	451	T	6-4 1/2 x 5	45.9	149-2600	450.9	6.00	368-1200	6	Se	I	CHS	1.93	1.71	1.50	1.50	.406	.406	.375	.375	(h)
52	G. M. C.	479	B	6-4 1/2 x 5 1/2	51.3	141-2600	478.8</															

COMMERCIAL VEHICLE ENGINES—continued

Front End Drive—Type	PISTONS				Number of Rings per Piston	CONNECTING RODS		CRANKSHAFT				SPARK PLUG		CARBUR-ETOR		OVERALL DIMENSIONS (In.)									
	Material	Length (In.)	Weight (with Pins, Rings and Bushing) (Oz.)	Piston Pin Diameter and Length (In.)		Material	Center to Center Length (In.)	Weight—With Bushing and Cap (Oz.)	Material	Counterbalances Used	Crank-pin Diameter and Length (In.)	Number	Main Bearings		Oil Pressure To	Recommended Make	Thread Size	Make	Size	Adapted for Use of Kerosene or Distillate	Weight (Without Carburetor or Ignition) Lb.	Overall Dimensions (In.)			
													Front	Rear								Width	Height	Length	
HG	CT	2.87	.703x2.43	3	CS	5 3/4		CS	N	1.50x1.18	3	1.75x1.37	1.75x1.78	abce		18 mm.		7/8	No	310	26	22	25 1/2	1	
HG	CT	3.56	.859x2.68	4	CS	7		CS	N	1.93x1.31	3	2.25x1.18	2.25x1.89	abce		18 mm.		1 1/4	No	400	26	26	29	2	
HG	CT	3.56	.859x2.68	4	CS	7		CS	N	1.93x1.31	3	2.25x1.18	2.25x1.89	abce		18 mm.		1 1/4	No	405	26	26	29	3	
HG	CT	3.56	.859x2.68	4	CS	7		CS	N	1.93x1.31	3	2.25x1.18	2.25x1.89	abce		18 mm.		1 1/4	No	410	26	26	29	4	
HG	CI	3.56	.859x2.62	4	CS	7		CS	N	1.93x1.31	4	2.25x1.21	2.25x1.81	abg		18 mm.		1 1/4	No	481	26	27 1/4	36	5	
Ch	CT	3.75	.859x2.49	4	CS	7		CS	Y	1.93x1.31	4	2.25x1.21	2.25x1.81	abce		18 mm.		1 1/4	No	491	26	27 1/4	36	6	
Ch	CT	3.75	.859x2.68	4	CS	7		CS	Y	1.93x1.31	4	2.25x1.21	2.25x1.81	abce		18 mm.		1 1/4	No	506	26	27 1/4	36	7	
Ch	CT	3.56	.859x2.68	4	CS	7		CS	Y	1.93x1.31	4	2.25x1.21	2.25x1.81	abce		18 mm.		1 1/4	No	512	26	27 1/4	36	8	
Ch	CT	3.56	.859x2.68	4	CS	7		CS	Y	1.93x1.31	4	2.25x1.21	2.25x1.81	abce		18 mm.		1 1/4	No	567	26	28	38	9	
Ch	AI	3.93	.859x2.87	4	CS	8 3/4		CS	Y	2.12x1.37	4	2.37x1.43	2.37x2.06	abce		18 mm.		1 1/2	No	567	26	28	38	10	
HG	CT	4.75	1.10x3.06	4	CS	8 3/4		CS	Y	2.25x1.56	7	2.62x1.56	2.62x2.15	abce		18 mm.		1 1/2	No	750	25 1/2	29	42	11	
HG	CT	4.75	1.10x3.18	4	CS	8 3/4		CS	Y	2.25x1.56	7	2.62x1.56	2.62x2.15	abce		18 mm.		1 1/2	No	760	25 1/2	29	42	12	
HG	CT	4.75	1.10x3.43	4	CS	8 3/4		CS	Y	2.25x1.56	7	2.62x1.56	2.62x2.15	abce		18 mm.		1 1/2	No	770	25 1/2	29	42	13	
HG	CT	5.31	1.25x3.08	4	CS	9		CS	Y	2.37x1.81	7	2.62x1.65	2.62x2.65	abce		18 mm.		1 1/2	No	925	25 1/2	32	44	14	
HG	CT	5.31	1.25x3.08	4	CS	9		CS	Y	2.37x1.81	7	2.62x1.65	2.62x2.65	abce		18 mm.		1 1/2	No	932	25 1/2	32	44	15	
HG	CT	5.31	1.25x3.43	4	CS	9		CS	Y	2.37x1.81	7	2.62x1.65	2.62x2.65	abce		18 mm.		1 1/2	No	938	25 1/2	32	44	16	
HG	CT	5.31	1.25x3.43	4	CS	9		CS	Y	2.37x1.81	7	2.62x1.65	2.62x2.65	abce		18 mm.		1 1/2	No	951	25 1/2	32	44	17	
Ch	AI	5.31	1.25x3.43	4	CS	9 1/2		CV	N	2.50x1.81	7	2.75x1.75	2.75x2.81	abcefg		18 mm.		1 1/2	No	1298	25 1/2	36	46	18	
Ch	AI	5.31	1.25x3.68	4	CS	9 1/2		CV	N	2.50x1.81	7	2.75x1.75	2.75x2.81	abcefg		18 mm.		1 1/2	No	1318	25 1/2	36	46	19	
Ch	AI	5.93	1.50x3.71	4	AS	10 1/2		CV	Y	2.75x1.81	7	2.75x1.75	2.75x2.81	abcefg		18 mm.		1 1/2	No	1430	25 1/2	39	46	20	
Ch	AI	3.68	.859x2.75	4	AS	7 1/2		CS	Y	2.06x1.00	4	2.50x1.93	2.50x1.87	abce	CH	14 mm.	Str	1 1/2	No	546				21	
Ch	AI	3.87	.859x2.87	4	AS	8		CS	Y	2.12x1.21	4	2.50x1.31	2.50x1.87	abce	CH	14 mm.	Car	1 1/2	No	597				22	
Ch	AI	3.87	.859x2.87	4	AS	8		CS	Y	2.12x1.21	4	2.50x1.31	2.50x1.87	abce	CH	14 mm.	Car	1 1/2	No	597				23	
Ch	AI	3.87	.859x2.87	4	AS	7 1/2		CS	Y	2.12x1.21	4	2.50x1.31	2.50x1.87	abce	CH	14 mm.	Car	1 1/2	No	612				24	
Ch	AI	4.56	1.12x3.25	4	AS	10 1/2		CS	Y	2.31x1.43	7	3.00x1.87	3.00x3.04	abce	Au	14 mm.	Str	1 1/2	No	1062				25	
HG	AI	6.12	77.0	1.37x4.17	4	CS	12 3/4	132	CNS	Y	2.37x3.00	3	2.62x3.31	2.62x4.00	abcefg	AC	1 1/2-18	Zen	1 1/2	No	1450	27	37	70 1/2	26
HG	AI	6.12	77.0	1.37x4.17	4	CS	12 3/4	132	CNS	Y	2.37x3.00	4	2.62x3.31	2.62x4.00	abcefg	AC	1 1/2-18	Zen	1 1/2	No	1900	27	37	87 1/2	27
Ch	AI				AS				CNS	N					Splash	CH		Zen		No					28
Ch	AI				AS				CNS	N					Splash	CH		Zen		No					29
Ch	AI				AS				CNS	N					Splash	CH		Til		No					30
Ch	AI				AS				CNS	N					Splash	CH		Sch		No					31
Ch	AI				AS				CNS	N					Splash	CH		Sch		No					32
Ch	AI				AS				CNS	N					Splash	CH		Sch		No					33
Ch	AI				AS				CNS	N					Splash	CH		Sch		No					34
Ch	AI				AS				CNS	N					Splash	CH		Sch		No					35
Ch	AI				AS				CNS	N					Splash	CH		Sch		No					36
HG	CAS	10.6	.687x2.36	3	AS	6 1/8	9.5	CAS	Y	1.60x1.54	3	2.00x1.66	2.00x2.00	abce	CH	14 mm.	Str	.81	No	268	18	32	30	37	
HG	CAS	15.6	.750x2.84	3	AS	7	16.8	CAS	Y	2.00x1.75	3	2.50x1.72	2.50x2.25	abce	CH	14 mm.	Str	.97	No	475	20	34	31	38	
HG	CAS	16.8	.750x2.84	3	AS	7	17.2	CAS	Y	2.14x1.75	3	2.50x1.72	2.50x2.25	abce	CH	14 mm.	Str	.97	No	485	18	32	30	39	
HG	AI	4.37	36.0	1.25x3.12	5	AS	9 1/2	54	CS	Y	2.37x1.75	7	2.70x2.25	2.70x2.87	abcefg	CH	18 mm.	Zen	1 1/2	No	1247	40 1/2	27 1/4	44	40
HG	AI	4.37	36.0	1.25x3.12	5	AS	9 1/2	54	CS	Y	2.37x1.75	7	2.70x2.25	2.70x2.87	abcefg	CH	18 mm.	Zen	1 1/2	No	1087	24 1/2	37	44	41
HG	AI	4.37	38.0	1.25x3.12	5	AS	9 1/2	54	CS	Y	2.37x1.75	7	2.70x2.25	2.70x2.87	abcefg	CH	18 mm.	Zen	1 1/2	No	1247	40 1/2	27 1/4	44	42
HG	AI	4.37	38.0	1.25x3.12	5	AS	9 1/2	54	CS	Y	2.37x1.75	7	2.70x2.25	2.70x2.87	abcefg	CH	18 mm.	Zen	1 1/2	No	1087	24 1/2	37	44	43
HG	AI	3.21	18.0	.859x3.12	5	AS	7	74	CS	Y	1.93x1.00	3	2.25x1.25	2.25x1.50	ace	CH	14 mm.	Op	1-1 1/4	No	315	34	18	18	44
HG	AI	4.20	33.5	.990x3.07	4	CS	7	33	CS	Y	2.31x1.23	4	2.68x1.18	2.78x1.46	abcefg	AC	14 mm.	Zen	1 1/2	No		21	26	40 1/2	45
HG	AI	4.15	34.0	.990x3.25	4	CS	7	33	CS	Y	2.31x1.23	4	2.68x1.18	2.78x1.46	abcefg	AC	14 mm.	Zen	1 1/2	No		21	26	40 1/2	46
HG	AI	4.39	37.0	1.00x3.17	4	CS	9 1/2	51	CS	Y	2.37x1.34	7	2.75x2.09	2.75x2.09	abcefg	AC	14 mm.	Zen	1 1/2	No		25 1/2	31	45	47
HG	AI	4.39	39.6	1.00x3.36	4	CS	9 1/2	51	CS	Y	2.37x1.34	7	2.75x2.09	2.75x2.09	abcefg	AC	14 mm.	Zen	1 1/2	No		25 1/2	31	45	48
HG	AI	5.39	58.5	1.25x3.59	4	CS	10 1/2	72.8	CS	Y	2.62x1.46	7	3.00x2.21	3.00x2.21	abcefg	AC	14 mm.	Zen	1 1/2	No		22 1/2	35	47	49
HG	AI	5.14	59.8	1.25x3.71	4	CS	10 1/2	72.8	CS	Y	2.62x1.46	7	3.00x2.21	3.00x2.21	abcefg	AC	14 mm.	Zen	1 1/2	No		22 1/2	35	47	50
HG	AI	5.14	62.6	1.25x3.84	4	CS	10 1/2	72.8	CS	Y	2.62x1.46	7	3.00x2.21	3.00x2.21	abcefg	AC	14 mm.	Zen	1 1/2	No		22 1/2	35	47	51
HG	AI	5.25	66.4	1.25x4.06	4	AS	9 1/2	80.9	CS	Y	2.62x1.71	7	3.50x2.50	3.50x2.50	abcefg	AC	14 mm.	Zen	2	No		22 1/2	35	47	52
HG	AI	5.25	66.4	1.25x4.06	4	AS	10 1/2	82.1	CS	Y	2.62x1.71	7	3.50x2.50	3.50x2.50	abcefg	AC	14 mm.	Zen	2						

AMERICAN STOCK, MARINE AND

Line Number	MAKE AND MODEL	Designed for	Number of Cylinders Bore and Stroke (In.)	Rated Hp. (A.M.A.)	Maximum Brake Hp. at Specified R.P.M.	Piston Displacement (Cu. In.)	Compression Ratio	Maximum Torque at R.P.M. (Lb. Ft.)	No. of Cylinders Cast In One Piece	Crankcase - Upper Half Integral with Cylinders	Arrangement	Exhaust Head Material or S.A.E. No.	VALVES								Seat Angle (Degrees)	
													Max. Head Diameter (In.)		Min. Port Diameter (In.)		Lift (In.)		Stem Diameter (In.)			
													Intake	Exhaust	Intake	Exhaust	Intake	Exhaust	Intake	Exhaust		
1	Hercules	NXA	Tr. M	2-3x4	7.2	13-2000	56.5	5.50	39.1100	2	In	L	Sil	1.48	1.35	1.25	1.12	.250	.250	.312	.312	30
2	Hercules	NXB	Tr. M	2-3 1/2 x4	8.9	15.6-2000	66.3	5.50	46-1100	2	In	L	Sil	1.48	1.35	1.25	1.12	.250	.250	.312	.312	30
3	Hercules	ZXA	Tr. Ind	4-2 1/2 x3	10.0	23-3800	58.8	6.10	40-2000	4	In	L	Sil	1.23	1.10	1.00	.875	.200	.200	.248	.248	30
4	Hercules	ZXB	Tr. Ind	4-2 1/2 x3	11.0	25-3800	64.9	6.10	44-2000	4	In	L	Sil	1.23	1.10	1.00	.875	.200	.200	.248	.248	30
5	Hercules	IX	T, Tr, Ind	4-2 1/2 x4	10.0	28-3200	78.0	5.20	55-2000	4	In	L	Sil	1.48	1.35	1.25	1.12	.250	.250	.310	.310	30
6	Hercules	IXA	T, Tr, Ind	4-3x4	14.4	40-3200	113.0	5.50	79-2000	4	In	L	Sil	1.48	1.35	1.25	1.12	.250	.250	.310	.310	30
7	Hercules	IXB	T, Tr, Ind	4-3 1/2 x4	16.9	47-3200	133.0	5.20	92-2000	4	In	L	Sil	1.48	1.35	1.25	1.12	.250	.250	.310	.310	30
8	Hercules	OOA	T, B, Tr, Ind	4-3 1/2 x4 1/2	19.6	35-2000	173.2	4.20	107-1200	4	In	L	Sil	1.75	1.62	1.50	1.37	.326	.326	.373	.373	45
9	Hercules	OOB	T, B, Tr, Ind	4-3 1/2 x4 1/2	22.5	38-2000	198.8	4.20	125-1000	4	In	L	Sil	1.75	1.62	1.50	1.37	.326	.326	.373	.373	45
10	Hercules	OOO	T, B, Tr, Ind	4-4x4 1/2	25.6	41-2000	226.2	4.20	143-1000	4	In	L	Sil	1.75	1.62	1.50	1.37	.326	.326	.373	.373	45
11	Hercules	OX	T, B, Tr, Ind	4-4x5	25.6	46-1800	251.3	4.30	155-1000	4	In	L	Sil	1.87	1.87	1.81	1.81	.326	.326	.373	.373	45
12	Hercules	OXO	T, B, Tr, Ind	4-4 1/2 x5	28.9	56-1800	283.5	4.30	185-1000	4	In	L	Sil	1.87	1.87	1.81	1.81	.326	.326	.373	.373	45
13	Hercules	K	T, Tr, Ind	4-4 1/2 x5 1/2	28.9	55-1800	326.3	3.99	202-1000	4	In	L	Sil	2.25	2.25	2.00	2.00	.326	.326	.434	.434	45
14	Hercules	L	T, Tr, Ind	4-4 1/2 x5 1/2	32.4	59-1800	365.8	3.78	226-1000	4	In	L	Sil	2.25	2.25	2.00	2.00	.326	.326	.434	.434	45
15	Hercules	G	T, Tr, Ind	4-4 1/2 x5 1/2	35.1	63-1800	407.6	3.89	250-1000	4	In	L	Sil	2.25	2.25	2.00	2.00	.326	.326	.434	.434	45
16	Hercules	E	T, Tr, Ind	4-5x5 1/2	40.0	74-1600	451.4	4.00	288-1000	4	In	L	Sil	2.25	2.25	2.00	2.00	.326	.326	.434	.434	45
17	Hercules	TX	Ind	4-5 1/2 x7	48.4	88-1200	685.0	3.84	425-800	4	In	L	Sil	2.90	2.90	2.50	2.50	.375	.375	.497	.497	45
18	Hercules	TXA	Ind	4-6x7	57.6	98-1200	792.0	3.84	488-800	4	In	L	Sil	2.90	2.90	2.50	2.50	.375	.375	.497	.497	45
19	Hercules	TXO	Ind	4-6 1/2 x7	65.0	112-1200	894.0	3.84	586-800	4	In	L	Sil	2.90	2.90	2.50	2.50	.375	.375	.497	.497	45
20	Hercules	OXB	T, B, Tr, Ind	6-3 1/2 x4 1/2	23.4	59-3000	190.0	5.50	130-1000	6	In	L	Sil	1.48	1.35	1.31	1.12	.251	.251	.310	.310	30
21	Hercules	OXC	T, B, Tr, M	6-3 1/2 x4 1/2	25.3	65.5-3500	205.0	5.85	143-1000	6	In	L	Sil	1.48	1.39	1.31	1.12	.281	.281	.312	.312	30
22	Hercules	OXO	T, B, Tr, M	6-3 1/2 x4 1/2	27.3	70.5-3500	221.0	5.85	154-1000	6	In	L	Sil	1.60	1.39	1.43	1.12	.281	.281	.312	.312	30
23	Hercules	JXA	T, B, Tr, Ind	6-3 1/2 x4 1/2	27.3	63-2800	228.0	5.16	141-1000	6	In	L	Sil	1.75	1.62	1.50	1.37	.322	.322	.373	.373	45
24	Hercules	JXB	T, B, Tr, Ind	6-3 1/2 x4 1/2	31.5	68-2800	263.0	5.40	163-1000	6	In	L	Sil	1.75	1.62	1.50	1.37	.322	.322	.373	.373	45
25	Hercules	JXC	T, B, Tr, Ind	6-3 1/2 x4 1/2	33.7	73-2800	282.0	5.35	175-1000	6	In	L	Sil	1.75	1.62	1.50	1.37	.322	.322	.373	.373	45
26	Hercules	JXD	T, B, Tr, Ind	6-4x4 1/2	38.4	84-2800	320.0	5.63	204-1000	6	In	L	Sil	1.75	1.62	1.50	1.37	.322	.322	.373	.373	45
27	Hercules	WXC	T, B, Tr, Ind	6-4x4 1/2	38.4	90-2400	339.0	5.00	212-1000	6	In	L	Sil	1.75	1.62	1.50	1.37	.322	.322	.373	.373	45
28	Hercules	WXC-2	T, B, Tr, Ind	6-4 1/2 x4 1/2	40.8	95-2400	360.8	5.00	233-1000	6	In	L	Sil	1.75	1.62	1.50	1.37	.322	.322	.373	.373	45
29	Hercules	WXC-3	T, B, Tr, Ind	6-4 1/2 x4 1/2	43.3	101-2400	383.0	5.00	262-1000	6	In	L	Sil	1.75	1.62	1.50	1.37	.322	.322	.373	.373	45
30	Hercules	YXC	T, B, Tr, Ind	6-4 1/2 x4 1/2	45.9	94-2200	428.4	4.40	281-800	6	In	L	Sil	2.00	2.00	1.75	1.75	.398	.398	.373	.373	45
31	Hercules	YXC-2	T, B, Tr, Ind	6-4 1/2 x4 1/2	48.6	98-2200	453.0	4.77	300-800	6	In	L	Sil	2.00	2.00	1.75	1.75	.398	.398	.373	.373	45
32	Hercules	YXC-3	T, B, Tr, Ind	6-4 1/2 x4 1/2	51.3	104-2200	478.8	4.40	320-800	6	In	L	Sil	2.00	2.00	1.75	1.75	.398	.398	.373	.373	45
33	Hercules	RXL	T, B, Tr, M	6-4 1/2 x5 1/2	51.3	135-2200	529.2	5.40	388-1000	6	In	L	Sil	2.00	2.00	1.75	1.75	.398	.398	.375	.375	45
34	Hercules	RXB	T, B, Tr, Ind	6-4 1/2 x5 1/2	48.6	110-2200	500.9	4.95	330-1000	6	In	L	Sil	2.00	2.00	1.75	1.75	.398	.398	.373	.373	45
35	Hercules	RXC	T, B, Tr, Ind	6-4 1/2 x5 1/2	51.3	114-2200	529.2	4.95	350-1000	6	In	L	Sil	2.00	2.00	1.75	1.75	.398	.398	.373	.373	45
36	Hercules	RXLD	T, B, Tr, M	6-4 1/2 x5 1/2	54.2	142-2200	559.2	4.40	407-1000	6	In	L	Sil	2.00	2.00	1.81	1.75	.398	.398	.375	.375	(h)
37	Hercules	HXB	T, B, Tr, Ind	6-5x6	60.0	148-2000	707.0	4.50	455-1000	3	Se	L	Sil	2.44	2.31	2.12	2.07	.438	.438	.493	.493	30
38	Hercules	HXC	T, B, Tr, Ind	6-5 1/2 x6	66.2	164-2000	779.0	4.50	510-1000	3	Se	L	Sil	2.44	2.31	2.12	2.07	.438	.438	.498	.498	30
39	Hercules	HXD	T, B, Tr, Ind	6-5 1/2 x6	72.8	180-2000	855.0	4.50	555-1000	3	Se	L	Sil	2.44	2.31	2.12	2.00	.458	.458	.498	.498	30
40	Hercules	HXE	T, B, Tr, Ind	6-5 1/2 x6	79.4	198-2000	935.0	4.50	615-1000	3	Se	L	Sil	2.44	2.31	2.12	2.00	.458	.458	.498	.498	30
41	International	U-7	PU	4-3 1/2 x5	22.5	34.5-1200	220.9	4.80	153-1000	W	Se	I	Sil	1.78	1.78	1.56	1.56	.402	.402	.432	.432	45
42	International	U-10	PU	4-4 1/2 x5	28.9	45-1200	283.7	4.67	207-850	W	Se	I	Sil	1.90	1.75	1.68	1.48	.441	.441	.432	.432	45
43	International	300	PU	4-4 1/2 x6	36.1	56.5-1050	425.3	4.74	300-750	W	Se	I	Sil	2.18	2.18	1.75	1.93	.381	.423	.432	.432	45
44	International	PA-40	PU	6-3 1/2 x4 1/2	31.5	59-1800	278.7	4.53	182-1200	W	Se	I	Sil	1.87	1.75	1.62	1.50	.343	.343	.372	.372	45
45	International	PA-50	PU	6-3 1/2 x4 1/2	33.7	66-2000	298.2	5.72	200-1200	W	Se	I	Sil	1.87	1.75	1.62	1.50	.343	.343	.372	.372	45
46	International	PA-100	PU	6-5x5 1/2	60.0	110-1400	648.0	5.30	447-700	W	Se	I	Sil	2.37	2.37	2.12	2.12	.437	.437	.437	.437	45
47	International	FC-132	T	4-3 1/2 x4	16.8	33-2800	132.7	6.00	89-1200	4	In	L	Sil	1.34	1.18	1.18		.310	.310	.310	.310	45
48	International	HD-213	T	6-3 1/2 x4 1/2	26.3	78-3400	213.2	6.30	155-1000	6	In	L	Sil	1.68	1.43	1.50	1.34	.320	.320	.370	.370	45
49	International	HD-232	T	6-3 1/2 x4 1/2	26.3	81-3200	232.6	6.00	170-1000	6	In	L	Sil	1.68	1.34	1.50	1.15	.320	.320	.375	.375	45
50	International	FAB-241	T	16-3 1/2 x4 1/2	27.3	84-3200	241.5		175-800	W	In	I	Sil	1.63	1							

COMMERCIAL VEHICLE ENGINES—continued

Front End Drive—Type	PISTONS				Number of Rings per Piston	CONNECTING RODS		CRANKSHAFT					SPARK PLUG		CARBU-RETOR		OVERALL DIMENSIONS (In.)								
	Material	Length (In.)	Weight (with Pins, Rings and Bushing—(Oz.))	Piston Pin—Diameter and Length (In.)		Material	Center to Center Length (In.)	Weight—With Bushing and Cap (Oz.)	Material	Counterbalances Used	Crank-pin Diameter and Length (In.)	Number	Main Bearings		Oil Pressure To Recommended Make	Thread Size	Make	Size	Adapted for Use of Kerosene or Distillate	Weight (Without Carburetor or Ignition)—Lbs.	Width	Height	Length	Line Number	
													Front	Rear											
																									Diameter and Length (In.)
HG	CI	3.06	28.0	.750x2.56	3	AS	6 1/8	21	CS	Y	1.75x1.12	2	2.00x1.56	2.07x1.62	abe	Op	7/8-18	Op	Op	K	270	15 1/4	18 1/2	18 1/2	1
HG	CI	3.06	29.5	.750x2.81	3	AS	6 1/8	21	CS	Y	1.75x1.12	2	2.00x1.56	2.00x1.62	abce	Op	7/8-18	Op	Op	K	270	15 1/4	18 1/2	18 1/2	2
HG	CI	2.68	17.5	.687x2.18	3	3140	5 1/8	15.5	1045	N	1.50x1.00	3	2.00x1.31	2.00x1.37	abce	Op	14 mm.	Op	Op	K-D	179	14 1/4	16 1/2	21	3
HG	CI	2.43	18.0	.750x2.18	3	3140	6 1/8	21	1045	N	1.50x1.00	3	2.00x1.31	2.00x1.37	abce	Op	14 mm.	Op	Op	K-D	179	14 1/4	16 1/2	21	4
HG	CI	3.06	28.0	.750x2.56	3	3140	6 1/8	21	1045	N	1.75x1.12	3	2.00x1.56	2.00x1.62	abce	Op	18 mm.	Op	Op	K-D	250	16 1/4	18 1/2	24	5
HG	CI	3.06	29.5	.750x2.81	3	3140	6 1/8	21	1045	N	1.75x1.12	3	2.00x1.56	2.00x1.62	abce	Op	7/8-18	Op	Op	K-D	283	16 1/4	18 1/2	24	6
HG	CI	4.31	49.0	1.00x3.12	3	1035	8	37.5	1045	N	1.75x1.12	3	2.00x1.56	2.00x1.62	abce	Op	7/8-18	Op	Op	K-D	291	16 1/4	18 1/2	24	7
HG	CI	4.12	56.5	1.00x3.37	3	1035	8	37.5	1045	N	2.00x1.50	3	2.00x2.18	2.00x2.62	abce	Op	7/8-18	Op	Op	K-D	460	17 1/4	23 1/4	29	8
HG	CI	4.31	56.0	1.00x3.62	3	1035	8	37.5	1045	N	2.00x1.50	3	2.00x2.18	2.00x2.62	abce	Op	7/8-18	Op	Op	K-D	460	17 1/4	23 1/4	29	9
HG	CI	4.87	67.5	1.37x2.37	5	1035	9 1/2	58.5	1045	N	2.00x2.25	3	2.00x3.18	2.00x3.31	abce	Op	7/8-18	Op	Op	K-D	655	20 1/4	28 1/4	36	10
HG	CI	4.87	73.5	1.37x2.37	5	1035	9 1/2	58.5	1045	N	2.00x2.25	3	2.00x3.18	2.00x3.31	abce	Op	7/8-18	Op	Op	K-D	655	20 1/4	28 1/4	36	11
HG	CI	5.25	82.5	1.50x3.75	5	1035	10 1/2	83	1045	N	2.50x2.62	3	3.00x3.37	3.00x3.50	abce	Op	7/8-18	Op	Op	K-D	875	21 3/4	30 1/4	41	12
HG	CI	5.25	95.5	1.50x4.00	5	1035	10 1/2	83	1045	N	2.50x2.62	3	3.00x3.37	3.00x3.50	abce	Op	7/8-18	Op	Op	K-D	880	21 3/4	30 1/4	41	13
HG	CI	5.25	103.0	1.50x4.25	5	1035	10 1/2	83	1045	N	2.50x2.62	3	3.00x3.37	3.00x3.50	abce	Op	7/8-18	Op	Op	K-D	885	21 3/4	30 1/4	41	14
HG	CI	5.25	106.5	1.50x4.50	5	1035	10 1/2	83	1045	N	2.50x2.62	3	3.00x3.37	3.00x3.50	abce	Op	7/8-18	Op	Op	K-D	890	21 3/4	30 1/4	41	15
HG	CI	7.00	196.5	1.87x4.87	5	1035	13 1/4	178	1045	N	3.00x3.00	3	3.75x4.37	3.75x4.50	abce	Op	7/8-18	Op	Op	K-D	890	21 3/4	30 1/4	41	16
HG	CI	7.00	222.5	1.87x5.37	5	1035	13 1/4	178	1045	N	3.00x3.00	3	3.75x4.37	3.75x4.50	abce	Op	7/8-18	Op	Op	K-D	1800	26 3/4	38 1/4	52 1/2	17
HG	CI	7.00	240.0	1.87x5.75	5	1035	13 1/4	178	1045	N	3.00x3.00	3	3.75x4.37	3.75x4.50	abce	Op	7/8-18	Op	Op	K-D	1815	26 3/4	38 1/4	52 1/2	18
HG	CI	3.50	52.7	.875x2.67	4	1035	7	26	CS	Y	1.98x1.02	7	2.50x1.39	2.50x1.93	abce	Op	7/8-18	Op	Op	K-D	480	21 1/4	22 3/4	33	19
HG	CI	3.50	52.7	.875x2.79	4	CS	7	26	CS	N	2.00x1.25	7	2.50x1.31	2.50x1.93	abce	Op	7/8-18	Op	Op	K-D	480	21 1/4	22 3/4	33	20
HG	CI	3.50	52.7	.875x2.90	4	CS	7	26	CS	N	2.00x1.25	7	2.50x1.31	2.50x1.93	abce	Op	7/8-18	Op	Op	K	480	16 1/4	20 1/4	22 1/2	21
HG	CI	4.37	43.0	1.00x2.90	4	1035	8	37.5	1045	Op	2.00x1.50	7	2.50x1.31	2.50x2.12	abce	Op	7/8-18	Op	Op	K	550	17 1/4	23 1/4	37	22
HG	CI	4.18	48.0	1.00x3.15	4	1035	8	37.5	1045	Op	2.00x1.50	7	2.50x1.31	2.50x2.12	abce	Op	7/8-18	Op	Op	K-D	560	17 1/4	23 1/4	37	23
HG	CI	4.12	56.5	1.00x3.37	4	1035	8	37.5	1045	Op	2.00x1.50	7	2.50x1.31	2.50x2.12	abce	Op	7/8-18	Op	Op	K-D	560	17 1/4	23 1/4	37	24
HG	AI	4.18	40.5	1.00x3.51	5	1035	8	37.5	1045	Op	2.00x1.50	7	2.50x1.31	2.50x2.12	abce	Op	7/8-18	Op	Op	K-D	565	17 1/4	23 1/4	37	25
HG	AI	4.56	64.5	1.12x3.66	5	1035	9 1/2	51.5	1045	Op	2.25x1.50	7	2.62x1.75	2.62x2.75	abce	Op	7/8-18	Op	Op	K-D	570	17 1/4	23 1/4	37	26
HG	AI	4.56	65.0	1.12x3.66	5	1035	9 1/2	51.5	1045	Op	2.25x1.50	7	2.62x1.75	2.62x2.75	abce	Op	7/8-18	Op	Op	K-D	805	21 1/4	27 1/4	41	27
HG	AI	4.56	83.0	1.12x3.68	5	1035	9 1/2	51.5	1045	Op	2.25x1.50	7	2.62x1.75	2.62x2.75	abce	Op	7/8-18	Op	Op	K-D	810	21 1/4	27 1/4	41	28
HG	AI	4.87	79.5	1.25x3.93	5	1035	9 1/2	64.5	1045	Op	2.50x1.75	7	3.00x2.00	3.00x3.00	abce	Op	7/8-18	Op	Op	K-D	820	21 1/4	27 1/4	41	29
HG	AI	4.87	85.0	1.25x3.93	5	1035	9 1/2	64.5	1045	Op	2.50x1.75	7	3.00x2.00	3.00x3.00	abce	Op	7/8-18	Op	Op	K-D	975	21 3/4	31 1/4	45	30
HG	AI	4.87	87.0	1.25x4.06	5	1035	9 1/2	64.5	1045	Op	2.50x1.75	7	3.00x2.00	3.00x3.00	abce	Op	7/8-18	Op	Op	K-D	975	21 3/4	31 1/4	45	31
HG	AI	4.87	100.0	1.25x4.10	5	AS	9 1/2	81	CS	Y	3.00x2.00	7	3.50x1.93	3.50x2.93	abce	Op	7/8-18	Op	Op	K-D	975	21 3/4	31 1/4	45	32
HG	AI	4.87	60.0	1.25x3.93	5	3140	9 1/2	81	1045	Op	2.62x2.00	7	3.00x1.93	3.00x2.93	abce	Op	7/8-18	Op	Op	K-D	1000	21 3/4	31 1/4	45	33
HG	AI	4.87	62.0	1.25x4.06	5	3140	9 1/2	81	1045	Op	2.62x2.00	7	3.00x1.93	3.00x2.93	abce	Op	7/8-18	Op	Op	K-D	1010	21 3/4	31 1/4	45	34
HG	AI	4.87	100.0	1.25x4.10	5	AS	9 1/2	81	CS	Y	3.00x2.00	7	3.50x1.93	3.50x2.93	abce	Op	7/8-18	Op	Op	K-D	1010	21 3/4	31 1/4	45	35
HG	AI	6.50	95.0	1.50x4.43	4	3140	12	143	1045	Op	3.00x2.25	7	3.50x2.37	3.50x3.50	abede	Op	7/8-18	Op	Op	K-D	1810	24 1/4	40 1/4	54 1/2	36
HG	AI	6.87	105.0	1.50x4.56	4	3140	12	143	1045	Op	3.00x2.25	7	3.50x2.37	3.50x3.50	abede	Op	7/8-18	Op	Op	K-D	1810	24 1/4	40 1/4	54 1/2	37
HG	AI	6.87	117.5	1.50x4.81	4	3140	12	143	1045	Op	3.00x2.25	7	3.50x2.37	3.50x3.50	abede	Op	7/8-18	Op	Op	K-D	1830	24 1/4	40 1/4	54 1/2	38
HG	AI	7.25	127.5	1.50x5.06	4	3140	12	143	1045	Op	3.00x2.25	7	3.50x2.37	3.50x3.50	abede	Op	7/8-18	Op	Op	K-D	1830	24 1/4	40 1/4	54 1/2	39
HG	CI	4.71	63.0	1.29x3.37	4	AS	10	73	CNS	N	2.25x2.23	2 1/2	2.70x1.53	2.70x2.54	Splash	CA	-18	Zen	1 1/2	K-D	1435	22 1/4	39	40	41
HG	CI	6.03	95.0	1.29x3.68	4	AS	11 1/4	102.4	CNS	N	2.62x2.73	2 1/2	2.70x1.53	2.70x2.54	Splash	CA	-18	Zen	1 1/2	K-D	1735	22 1/4	42 1/4	42	42
HG	CI	5.82	122.0	1.48x4.12	4	AS	13	152	CNS	N	3.12x2.73	2 1/2	2.70x1.53	2.70x2.54	Splash	CA	-18	Zen	1 1/2	K-D	2160	27 1/4	44 1/4	45 1/4	43
HG	CI	3.93	45.0	1.10x3.05	4	AS	9 1/4	49	CS	Y	2.25x1.62	7	2.70x1.53	2.70x2.54	abede	CA	-18	Zen	1 1/2	D	1920	28 1/4	35 1/4	49	44
HG	CI	4.56	34.4	1.10x3.17	4	AS	9 1/4																		

AMERICAN STOCK, MARINE AND

Line Number	MAKE AND MODEL	Designed for	Number of Cylinders Bore and Stroke (In.)	Rated Hp. (A.M.A.)	Maximum Brake Hp. at Specified R.P.M.	Piston Displacement (Cu. In.)	Compression Ratio	Maximum Torque at R.P.M. (Lb. Ft.)	No. of Cylinders Cast In One Piece	Crankcase—Upper Half Integral with Cylinders	Arrangement	Exhaust Head Material or S.A.E. No.	VALVES								Seat Angle (Degrees)	
													Max. Head Diameter (In.)		Min. Port Diameter (In.)		Lift (In.)		Stem Diameter (In.)			
													Intake	Exhaust	Intake	Exhaust	Intake	Exhaust	Intake	Exhaust		
1	Lehman-Ford	V5	M	8-3 1/2 x 3 3/4	85-3200	221.0	6.12	140-2000	8	In	L	CNS	1.53	1.53			.307	.307	.310	.310	45	
2	Lehman-Mercury	M5	M	8-3 1/2 x 3 3/4	95-3600	239.0	6.12	170-2100	8	In	L	CNS	1.53	1.53			.307	.307	.310	.310	45	
3	Lehman-Zephyr	Z5	M	12-2 1/2 x 3 3/4	110-3600	267.2	6.70	186-2000	12	In	L	CNS										
4	Lycorning	DC	T	4-3 1/2 x 3 1/2	17.5	30-2500	134.0	5.75	92-1000	4	In	L	Sil	1.54	1.42	1.37	1.25	.281	.281	.343	.343	30
5	Lycorning	AFD	Ind	4-3 1/2 x 3 1/2	22.5	37-1600	198.8	4.82	134-750	4	In	L	Sil	1.65	1.53	1.50	1.37	.312	.312	.343	.343	45
6	Lycorning	AFE	T	4-3 1/2 x 3 1/2	22.5	49-2600	198.8	4.82	135-1150	4	In	L	Sil	1.65	1.65	1.50	1.37	.312	.312	.343	.343	45
7	Lycorning	WF	C	6-3 1/2 x 4 1/2	22.5	82-3500	209.9	6.20	155-1800	6	In	L	Sil	1.56	1.40	1.37	1.25	.312	.312	.343	.343	(h)
8	Lycorning	ASE	T, B	6-3 1/2 x 4 1/2	33.7	90-3100	298.2	5.26	205-900	6	In	L	Sil	1.93	1.81	1.75	1.62	.312	.312	.375	.375	(h)
9	Lycorning	GFD	Ta	8-3 1/2 x 4 1/2	30.0	74-2800	279.9	5.75	192-800	8	In	L	Sil	1.56	1.40	1.37	1.25	.281	.281	.343	.343	(h)
10	Lycorning	GG	C	8-3 1/2 x 4 1/2	30.0	113-3600	279.9	6.67	210-1800	8	In	L	Sil	1.56	1.40	1.37	1.25	.312	.312	.343	.343	(h)
11	Lycorning	FB	C	8-3 1/2 x 4 1/2	39.2	115-3500	288.6	6.32	222-2000	8	In	HB	Sil	1.69	1.50	1.50	1.37	.343	.343	.343	.343	(h)
12	Lycorning	AEF	T, B	8-3 1/2 x 4 1/2	45.0	120-2800	419.6	5.26	302-1200	8	In	L	Sil	1.93	1.62	1.75	1.50	.343	.343	.375	.375	(h)
13	Lycorning	GH	C	8-3 1/2 x 4 1/2	30.0	148-2000	279.9	6.67	232-2400	8	In	L	Sil	1.56	1.40	1.37	1.25	.312	.312	.343	.343	(h)
14	Lycorning	FC	C	8-3 1/2 x 3 1/2	39.2	175-4200	288.6	6.32	258-2800	8	In	HB	Sil	1.68	1.50	1.50	1.37	.343	.343	.343	.343	(h)
15	Lycorning	BF	T	12-3 1/2 x 4 1/2	58.8	170-3300	490.6	7.04	364-1300	12	In	HH	Sil	1.65	1.55	1.37	1.37	.343	.343	.343	.343	30
16	Lycorning	EUF	Ind	12-4 1/2 x 4 1/2	108.3	245-1800	1010.1	5.12		12	In	HH	Sil	2.21	2.09	2.00	1.81	.437	.437	.437	.437	30
17	Lycorning	UAG	M	4-3 1/2 x 3 1/2		58-3400	134.0	6.50	106-1800	4	In	L	Sil	1.54	1.42	1.37	1.25	.312	.312	.343	.343	30
18	Lycorning	UAGS	M	4-3 1/2 x 3 1/2		80-4500	134.0	8.80		4	In	L	Sil	1.54	1.54	1.37	1.25	.375	.375	.343	.343	30
19	Lycorning	UF	M	12-4 1/2 x 4 1/2		325-2500	1010.1	5.12	750-1700	12	In	HH	Sil	2.21	2.09	2.00	1.81	.437	.437	.437	.437	30
20	Lycorning	UFD	M	6-3 1/2 x 4 1/2		325-2500	1010.1	5.12	750-1700	12	In	HH	Sil	2.21	2.09	2.00	1.81	.437	.437	.437	.437	30
21	Lycorning	UHB	M	6-3 1/2 x 4 1/2		175-5000	222.9	6.70	170-2000	6	In	L	Sil	1.56	1.40	1.37	1.25	.312	.312	.343	.343	(h)
22	Lycorning	UHB	M	6-3 1/2 x 4 1/2		175-5000	222.9	6.70	170-2000	6	In	L	Sil	1.56	1.40	1.37	1.25	.312	.312	.343	.343	(h)
23	Lycorning	UHB	M	6-3 1/2 x 4 1/2		175-5000	222.9	6.70	170-2000	6	In	L	Sil	1.56	1.40	1.37	1.25	.312	.312	.343	.343	(h)
24	Lycorning	UHB	M	6-3 1/2 x 4 1/2		175-5000	222.9	6.70	170-2000	6	In	L	Sil	1.56	1.40	1.37	1.25	.312	.312	.343	.343	(h)
25	Lycorning	UJ	M	6-3 1/2 x 4 1/2		125-3400	297.2	6.70	220-1700	8	In	L	Sil	1.56	1.40	1.37	1.25	.312	.312	.343	.343	(h)
26	Lycorning	UJ	M	6-3 1/2 x 4 1/2		125-3400	297.2	6.70	220-1700	8	In	L	Sil	1.56	1.40	1.37	1.25	.312	.312	.343	.343	(h)
27	Lycorning	UEB	M	8-3 1/2 x 4 1/2		165-3200	419.6	6.10	305-2000	8	In	L	Sil	1.93	1.81	1.75	1.62	.343	.343	.375	.375	(h)
28	Lycorning	UEB	M	8-3 1/2 x 4 1/2		165-3200	419.6	6.10	305-2000	8	In	L	Sil	1.93	1.81	1.75	1.62	.343	.343	.375	.375	(h)
29	Lycorning	UEB	M	8-3 1/2 x 4 1/2		165-3200	419.6	6.10	305-2000	8	In	L	Sil	1.93	1.81	1.75	1.62	.343	.343	.375	.375	(h)
30	Mack	ENU	T	6-3 1/2 x 4 1/2	24.4	67-3000	210.0	5.75	145-1100	6	In	L	AUS	1.51	1.34	1.37	1.18	.296	.296	.339	.341	30
31	Mack	FO	T, B	6-3 1/2 x 4 1/2	29.4	78-3000	253.0	5.69	168-1200	6	In	L	Sil	1.76	1.51	1.62	1.37	.354	.354	.406	.406	(h)
32	Mack	FM	T, B	6-3 1/2 x 4 1/2	31.6	83-3000	271.0	5.65	188-1200	6	In	L	Sil	1.76	1.51	1.62	1.37	.354	.354	.406	.406	(h)
33	Mack	FK	T, B	6-3 1/2 x 4 1/2	33.8	94-3000	290.0	5.68	200-1200	6	In	L	Sil	1.76	1.51	1.62	1.37	.354	.354	.406	.406	(h)
34	Mack	BG	T, B	6-3 1/2 x 5	31.6	96-2800	309.6	5.40	210-1000	6	In	L	MS	1.89	1.76	1.62	1.50	.365	.365	.375	.375	30
35	Mack	CU	T, B	6-3 1/2 x 5	38.0	103-2600	353.8	5.25	250-1000	6	In	L	MS	1.89	1.76	1.62	1.50	.365	.365	.375	.375	30
36	Mack	CE	T, B	6-4 1/2 x 5 1/2	36.4	108-2400	414.6	5.00	270-1000	6	Se	L	MS	2.17	2.01	1.81	1.68	.375	.375	.500	.500	30
37	Mack	CF	T, B	6-4 1/2 x 5 1/2	43.3	118-2400	467.9	5.00	310-1000	6	Se	L	MS	2.17	2.01	1.81	1.68	.375	.375	.500	.500	30
38	Mack	CT	T, B	6-4 1/2 x 5 1/2	48.6	126-2400	524.8	4.80	350-1000	6	Se	L	MS	2.17	2.01	1.81	1.68	.375	.375	.500	.500	30
39	Mack	EO	T, B	6-4 1/2 x 5 1/2	54.7	148-2200	519.0	5.50	380-1000	6	In	L	MS	2.18	1.89	2.04	1.75	.500	.500	.437	.437	30
40	Mack	EP	T, B	6-4 1/2 x 5 1/2	45.1	160-2200	611.0	5.40	465-900	6	In	L	MS	2.18	1.89	2.04	1.75	.500	.500	.437	.437	30
41	Mack	EY	T, B	6-5 1/2 x 6	60.0	170-2100	706.5	5.30	500-800	6	In	L	MS	2.18	1.89	2.04	1.75	.500	.500	.437	.437	30
42	Minneapolis-Moline	RE	T	4-3 1/2 x 4 1/2	26.0	31-1500	155.7	4.50	114-1100	2	Se	F	Sil	1.47	1.47	1.25	1.25	.355	.355	.341	.341	45
43	Minneapolis-Moline	KEA	Tr	4-4 1/2 x 5	33.0	39-1150	283.7	4.33	181-1000	4	Se	L	Sil	1.72	1.50	1.50	1.37	.488	.488	.375	.375	45
44	Minneapolis-Moline	KEC	Tr	4-4 1/2 x 5	36.0	42-1275	293.7	4.33	181-1000	4	Se	L	Sil	1.72	1.50	1.50	1.37	.488	.488	.375	.375	45
45	Minneapolis-Moline	KED	Tr	4-4 1/2 x 5	39.0	46-1275	293.7	4.60	199-1050	4	Se	L	Sil	1.72	1.50	1.50	1.37	.488	.488	.375	.375	45
46	Minneapolis-Moline	GE	Tr	4-4 1/2 x 6	46.0	54-1075	403.2	4.25	273-850	2	Se	L	Sil	1.84	1.72	1.62	1.50	.488	.488	.375	.375	45
47	Murray & Tregurtha	OC-4	M	4-6 1/2 x 8		80-1000	1062.4	3.33	560-600	2	Se	L	Spec	2.48	2.48	2.25	2.25	.500	.500	.437	.437	30
48	Murray & Tregurtha	M-4	M	4-6 1/2 x 8		90-1000	1062.4	4.20	660-700	2	Se	L	Spec	2.48	2.48	2.25	2.25	.500	.500	.437	.437	30
49	Murray & Tregurtha	K-6	M	6-6 1/2 x 7 1/2		325-1650	1426.6	5.25	1110-1525	3	Se	L	Spec	2.48	2.48	2.25	2.25	.375	.375	.437	.437	30
50	Murray & Tregurtha	OC-6	M	6-6 1/2 x 8		140-1100	1593.6	3.33	910-600	2	Se	L	Spec	2.46	2.46	2.25	2.25	.500	.500	.437	.437	30

COMMERCIAL VEHICLE ENGINES—continued

Front Drive—Type	PISTONS				Number of Rings per Piston	CONNECTING RODS		CRANKSHAFT				SPARK PLUG		CARBUR-ETOR		Adapted for Use of Kerosene or Distillate	Weight (Without Carburetor or Ignition)—Lb.	OVERALL DIMENSIONS (In.)							
	Material	Length (In.)	Weight (with Pins, Rings and Bushing)—(Oz.)	Piston Pin—Diameter and Length (In.)		Material	Center to Center Length (In.)	Weight—With Bushing and Cap (Oz.)	Material	Counterbalances Used	Crank-pin Diameter and Length (In.)	Main Bearings		Oil Pressure To	Recommended Make			Thread Size	Make	Size	Width	Height	Length	Line Number	
												Number	Front												Rear
HG	CAS	15.6	.750x2.84	3	AS			CAS	Y	2.00x....	3	2.40x1.41	2.40x1.86	abce	CH	14 mm.	Str	.97	No	695	22 3/4	30 1/2	47	1	
HG	CAS	16.8	.750x2.84	3	AS			CAS	Y	2.00x....	3	2.40x1.41	2.40x1.86	abce	CH	14 mm.	Str	1 1/2	No	695	22 3/4	30 1/2	47	2	
HG	CAS				AS			CAS	Y	2.00x....	3	2.40x1.83	2.40x2.25	abce	CH	14 mm.	Str	1 1/2	No	790	25	31 1/2	59 1/2	3	
HG	Al	3.68	22.0	.750x1.87	3	CS	8	30	CS	1.75x1.50	3	1.87x1.56	1.87x1.81	abce	Op	18 mm.	Op	1	No	348	17 1/2	26	25	4	
HG	Al	4.50	45.7	.875x3.21	4	CS	9	41.6	CS	2.12x1.50	3	2.12x1.75	2.12x2.37	abce	Op	14 mm.	Op	1	No	485	19 1/2	29	42	5	
HG	Al	4.50	45.7	.875x3.21	4	CS	9 1/2	41.6	CS	2.12x1.50	3	2.12x1.75	2.12x2.37	abc	Op	14 mm.	Op	1	No	475	25 1/2	33	30 1/2	6	
HG	Al	3.75	21.9	.875x2.50	4	CS	9 1/2	37.4	CS	2.18x1.25	4	2.37x1.93	2.37x1.87	abc	Op	14 mm.	Op	1 1/2	No	525	23	29 1/2	34 1/2	7	
HG	Al	4.25	36.0	1.00x3.21	4	CS	9	54.4	CS	2.34x1.68	4	2.62x2.12	2.62x2.75	abede	Op	18 mm.	Op	1 1/2	No	785	25 3/4	31	42 1/2	8	
HG	Al	3.75	32.0	.875x2.59	4	CS	9 1/2	38.7	CS	2.12x1.25	5	2.37x1.93	2.37x1.87	abed	Op	18 mm.	Op	1 1/2	No	680	22 3/4	29 1/2	43	9	
HG	Al	3.75	21.9	.875x2.59	4	CS	9 1/2	37.4	CS	2.12x1.25	5	2.37x1.93	2.37x1.87	abc	Op	14 mm.	Op	1	No	610	22 1/2	29 1/2	43	10	
HG	Al	3.93	26.5	.875x2.59	4	CS	9 1/2	31.6	CS	2.00x1.18	3	2.50x1.75	2.50x2.25	abedeg	Op	14 mm.	Op	1	No	550	22	34	34 1/2	11	
HG	Al	4.25	34.0	1.00x3.21	4	CS	9	54.4	CS	2.34x1.68	5	2.62x2.12	2.62x2.75	abede	Op	18 mm.	Op	1 1/2	No	1110	25 3/4	34 1/2	52 1/2	12	
HG	Al	3.75	21.9	.875x2.50	4	CS	9 1/2	37.4	CS	2.12x1.25	5	2.37x1.93	2.37x1.87	abc	Op	14 mm.	Op	1 1/2	No	705	28 3/4	29 1/2	41 1/2	13	
HG	Al	3.93	26.4	.875x2.59	4	CS	9 1/2	31.6	CS	2.00x1.18	3	2.50x1.75	2.50x1.75	abedeg	Op	14 mm.	Op	1 1/2	No	535	22	32 1/2	34 1/2	14	
HG	Al	3.87	25.6	.875x2.59	4	CS	9 1/2	40.8	CS	2.50x1.25	4	3.00x2.56	3.00x2.37	abedeg	Op	14 mm.	Op	1 1/2	No	1145	23	35 1/2	47	15	
HG	Al	5.68	69.8	1.18x4.15	5	CS	9	75.5	CS	3.00x1.62	4	6.00x2.12	6.00x2.12	abedeg	CH	18 mm.	Str(2)	2	No	2600	38 3/4	53	89 1/2	16	
HG	Al	3.68	22.0	.750x1.87	3	CS	8	30	CS	1.75x1.50	3	1.87x1.56	1.87x1.81	abce	CH	18 mm.	Zen	1 1/2	No	460	20	22 1/2	38 1/2	17	
HG	Al	5.68	69.8	1.18x4.15	5	CS	9	75.5	CS	3.00x1.62	4	6.00x2.12	6.00x2.12	abedeg	CH	18 mm.	Str(2)	2	No	2425	33	40	72	19	
HG	Al	5.68	69.8	1.18x4.15	5	CS	9	75.5	CS	3.00x1.62	4	6.00x2.12	6.00x2.12	abedeg	CH	18 mm.	Str(2)	2	No	2650	33	40	81 1/2	20	
HG	Al	3.75	21.1	.875x2.50	3	CS	9 1/2	37.4	CS	2.12x1.25	4	2.37x1.93	2.37x1.87	abce	CH	18 mm.	Zen	1 1/2	No	795	24 1/2	26	44	21	
HG	Al	3.75	21.1	.875x2.50	3	CS	9 1/2	37.4	CS	2.12x1.25	4	2.37x1.93	2.37x1.87	abce	CH	18 mm.	Zen	1 1/2	No	840	24 1/2	26	49 1/2	22	
HG	Al	3.75	21.1	.875x2.50	3	CS	9 1/2	37.4	CS	2.12x1.25	4	2.37x1.93	2.37x1.87	abce	CH	14 mm.	Zen(3)	1 1/2	No	605	26 1/2	29 1/2	41	23	
HG	Al	3.75	20.0	.875x2.50	3	CS	9 1/2	37.4	CS	2.12x1.25	4	2.37x1.93	2.37x1.87	abce	CH	18 mm.	Zen(2)	1 1/2	No	915	28 1/2	27 1/2	51 1/2	24	
HG	Al	4.25	32.0	.875x2.50	3	CS	9 1/2	37.4	CS	2.12x1.25	4	2.37x1.93	2.37x1.87	abce	CH	18 mm.	Zen(2)	1 1/2	No	1115	28 1/2	27 1/2	57	25	
HG	Al	4.25	32.0	1.00x3.18	4	CS	9	45.6	CS	2.34x1.68	5	2.62x2.53	2.62x2.75	abce	CH	18 mm.	Zen(2)	1 1/2	No	1385	27	30	68 1/2	26	
HG	Al	3.56	.859x2.68	4	CS	7	1.93x1.31	7	2.25x1.18	2.25x1.81	abc	CH	18 mm.	Str	1 1/2	No	501	25	23	39	28				
HG	Al	4.75	36.0	1.10x2.90	5	CS	8 3/4	44.5	CS	2.25x1.56	7	2.62x1.53	2.62x2.15	abc	CH	18 mm.	Str	1 1/2	No	749	18 1/2	29	43	29	
HG	Al	4.75	39.0	1.10x3.05	5	CS	8 3/4	44.5	CS	2.25x1.56	7	2.62x1.53	2.62x2.15	abc	CH	18 mm.	Str	1 1/2	No	738	18 1/2	29	43	30	
HG	Al	4.75	42.6	1.10x3.18	5	CS	8 3/4	44.5	CS	2.25x1.56	7	2.62x1.53	2.62x2.15	abc	CH	18 mm.	Str	1 1/2	No	759	18 1/2	29	43	31	
HG	Al	4.31	48.5	1.00x3.25	4	AS	11 1/4	54	CS	2.37x1.62	7	2.62x1.68	2.62x2.78	abc	CH	18 mm.	Str	1 1/2	No	959	25 1/2	34 1/2	49	32	
HG	Al	4.31	40.0	1.00x3.50	5	AS	11 1/4	54	CS	2.37x1.62	7	2.62x1.68	2.62x2.78	abc	CH	18 mm.	Str	1 1/2	No	937	26 1/2	34 1/2	46	33	
HG	Al	5.10	54.0	1.12x3.62	4	AS	12 1/2	83	CS	2.50x1.81	7	3.00x2.25	3.00x3.12	abc	CH	18 mm.	Str	1 1/2	No	1199	27 1/2	41	50	34	
HG	Al	5.48	62.0	1.12x3.87	5	AS	12 1/2	83	CS	2.50x1.81	7	3.00x2.25	3.00x3.12	abc	CH	18 mm.	Str	1 1/2	No	1209	27 1/2	41	50	35	
HG	Al	5.48	63.0	1.12x4.12	5	AS	12 1/2	83	CS	2.50x1.81	7	3.00x2.25	3.00x3.12	abc	CH	14 mm.	Str	1 3/4	No	1667	30 1/2	47 1/2	53	37	
HG	Al	5.75	68.0	1.43x3.78	5	AS	11 1/4	100.5	CS	3.00x2.09	7	3.50x1.68	3.50x2.37	abcf	CH	14 mm.	Str	2	No	1700	30 1/2	47 1/2	53	38	
HG	Al	5.75	83.0	1.43x4.15	5	AS	11 1/4	100.5	CS	3.00x2.09	7	3.50x1.68	3.50x2.37	abcf	CH	14 mm.	Str	2	No	1710	30 1/2	47 1/2	53	39	
HG	Al	5.62	95.0	1.43x4.40	5	AS	11 1/4	100.5	CS	3.00x2.09	7	3.50x1.68	3.50x2.37	abcf	CH	14 mm.	Str	2	No	1710	30 1/2	47 1/2	53	39	
HG	Al	4.37	51.0	1.00x3.00	4	CS	9	54	CS	2.62x1.50	24	SAE-313	SAE-314	becg	CH	18 mm.	Sch	1	K-D	660	19 1/2	34	34 1/2	40	
HG	Al	5.00	80.0	1.25x3.87	4	CS	10	98	CS	2.37x2.50	3	2.50x2.50	2.62x3.50	abceg	CH	14 mm.	Sch	1	K-D	1240	23 1/2	43 1/2	46 1/2	41	
HG	Al	5.00	80.0	1.25x3.87	4	CS	10	98	CS	2.37x2.50	3	2.50x2.50	2.62x3.50	abceg	CH	14 mm.	Sch	1	K-D	1240	23 1/2	43 1/2	46 1/2	42	
HG	Al	5.00	80.0	1.25x3.87	4	CS	10	98	CS	2.37x2.50	3	2.50x2.50	2.62x3.50	abceg	CH	14 mm.	Sch	1	K-D	1240	23 1/2	43 1/2	46 1/2	43	
HG	Al	5.50	103.0	1.25x4.25	4	CS	12	114	CS	2.37x2.87	3	2.87x3.87	3.12x5.75	abceg	CH	14 mm.	Sch	1 1/2	K-D	1275	22 1/2	47 1/2	42 1/2	44	
HG	Al	182.0	1.37x4.50	6	AS	15 1/2	180	CNS	2.56x3.16	5	2.56x3.48	2.56x4.25	aboder	Bos	18 mm.	Sho(2)	2	K-D	2350	32 1/2	54 1/2	78 1/2	45		
HG	Al	140.0	1.37x4.50	6	AS	15 1/2	180	CNS	2.56x3.16	5	2.56x3.48	2.56x4.25	aboder	Bos	18 mm.	Sho(2)	2	K-D	2450	32 1/2	54 1/2	78 1/2	46		
HG	Al	182.0	1.37x4.50	6	AS	15 1/2	180	CNS	2.56x3.16	5	2.56x3.48	2.56x4.25	aboder	Bos	18 mm.	Sho(2)	2	K-D	2400	32 1/2	54 1/2	78 1/2	47		
HG	Al	182.0	1.37x4.50	6	AS	15 1/2	180	CNS	2.56x3.16	5	2.56x3.48	2.56x4.25	aboder	Bos	18 mm.	Sho(2)	2	K-D	3830	32 1/2	54 1/2	93 1/2	48		
HG	Al	182.0	1.37x4.50	6	AS	15 1/2	180	CNS	2.56x3.16	5	2.56x3.48	2.56x4.25	aboder	Bos	18 mm.	Sho(2)	2	K-D	3050	32 1/2	54 1/2	93 1/2	49		
HG	Al																								

AMERICAN STOCK, MARINE AND

Line Number	MAKE AND MODEL	Designed for	Number of Cylinders Bore and Stroke (In.)	Rated Hp. (A.M.A.)	Maximum Brake Hp. at Specified R.P.M.	Piston Displacement (Cu. In.)	Compression Ratio	Maximum Torque at R.P.M. (Lb. Ft.)	No. of Cylinders Cast In One Piece	Crankcase—Upper Half Integral with Cylinders	Arrangement	Exhaust Head Material or S.A.E. No.	VALVES								Seat Angle (Degrees)	
													Max. Head Diameter (In.)		Min. Port Diameter (In.)		Lift (In.)		Stem Diameter (In.)			
													Intake	Exhaust	Intake	Exhaust	Intake	Exhaust	Intake	Exhaust		
1	Speedway	MP M	6-5 $\frac{1}{2}$ x7		190-1300	1090-6	4.30	780-1000	2	Se	L	Sil	2.50	2.50	2.12	2.50	.562	.562	.531	.531	45	
2	Speedway	MR M	6-5 $\frac{1}{2}$ x7		190-1300	1090-6	4.00	810-800	2	Se	L	Tun	2.78	2.78	2.25	2.25	.562	.562	.562	.562	45	
3	Speedway	MC M	6-5 $\frac{1}{2}$ x7		260-1800	1090-6	5.00	825-1400	2	Se	L	Tun	2.50	2.50	2.12	2.50	.562	.562	.531	.531	45	
4	Speedway	P M	6-6 $\frac{1}{2}$ x8 $\frac{1}{2}$		115-600	1825-0	3.80	1070-300	2	Se	L	Sil	2.62	2.62	2.12	2.62	.468	.468	.562	.562	45	
5	Speedway	R M	6-7x8 $\frac{1}{2}$		300-1200	1963-0	4.20	1480-800	1	Se	L	Tun	2.25	2.25	2.43	2.25	.500	.500	.562	.562	45	
6	Sterling	Neptune D2-12	M, Ind	2-5 $\frac{1}{2}$ x7	24.2	15-500	332.6	158-400	2	Se	L	Sil	2.06	2.06			.375	.375	.437	.437	45	
7	Sterling	Petrel L-6	M.T.Tr.B, Ind	6-5 $\frac{1}{2}$ x6	66.1	115-1200	780.0	4.30	500-	6	Se	Sil	2.25	2.25			.455	.455	.437	.437	45	
8	Sterling	Petrel L-6	M.T.Tr.B, Ind	6-5 $\frac{1}{2}$ x6	66.1	145-1500	780.0	4.68	500-1400	6	Se	Sil	2.25	2.25			.455	.455	.437	.437	45	
9	Sterling	Petrel L-6	M.T.Tr.B, Ind	6-5 $\frac{1}{2}$ x6	66.1	145-1500	780.0	4.68	500-1400	6	Se	Sil	2.25	2.25			.455	.455	.437	.437	45	
10	Sterling	Petrel L-6-6	M.T.Tr.B, Ind	6-5 $\frac{1}{2}$ x6	66.1	180-1800	780.0	5.00	500-1400	6	Se	Sil	2.25	2.25			.455	.455	.437	.437	45	
11	Sterling	Petrel Reduction L	M.T.Tr.B, Ind	6-5 $\frac{1}{2}$ x6	66.1	175-1800	780.0	4.68	500-1400	6	Se	Sil	2.25	2.25			.455	.455	.437	.437	45	
12	Sterling	Petrel L-6	M.T.Tr.B, Ind	6-5 $\frac{1}{2}$ x6	66.1	200-2000	780.0	5.54	500-1400	6	Se	Sil	2.25	2.25			.455	.455	.437	.437	45	
13	Sterling	Petrel L-6	M.T.Tr.B, Ind	6-5 $\frac{1}{2}$ x6	66.1	225-2200	780.0	5.50	500-1400	6	Se	Sil	2.25	2.25			.455	.455	.437	.437	45	
14	Sterling	Chevron 6	Tr, M, Ind	6-5 $\frac{1}{2}$ x6 $\frac{1}{2}$	72.6	85-800	962.0		590-1200	2	Se	Sil	2.25	2.25			.375	.375	.500	.500	45	
15	Sterling	Chevron 6	Tr, M, Ind	6-5 $\frac{1}{2}$ x6 $\frac{1}{2}$	72.6	130-1200	962.0		590-1200	2	Se	T	2.25	2.25			.375	.375	.500	.500	45	
16	Sterling	Chevron 6	Tr, M, Ind	6-5 $\frac{1}{2}$ x6 $\frac{1}{2}$	72.6	150-1500	962.0		590-1200	2	Se	T	2.25	2.25			.375	.375	.500	.500	45	
17	Sterling	Dolphin-Med. GRM-6	Tr, M, Ind	6-5 $\frac{1}{2}$ x6 $\frac{1}{2}$	79.3	165-1200	1051.6	3.85	785-1200	2	Se	L	Sil	1.87	1.87			.375	.375	.437	.437	60
18	Sterling	Dolphin 6-GR-6	Tr, M, Ind	6-5 $\frac{1}{2}$ x6 $\frac{1}{2}$	79.3	225-1550	1051.6	4.08	785-1200	2	Se	L	Sil	1.87	1.87			.375	.375	.437	.437	60
19	Sterling	Dolphin 6-GRS-6	Tr, M, Ind	6-5 $\frac{1}{2}$ x6 $\frac{1}{2}$	79.3	300-2000	1051.6	4.70	785-1200	2	Se	L	Sil	1.87	1.87			.375	.375	.437	.437	60
20	Sterling	Coast Guard M-6	Tr, M, Ind	6-6 $\frac{1}{2}$ x7 $\frac{1}{2}$	93.7	225-1200	1426.8	4.13	986-1200	W	Se	L	Sil	1.87	1.87			.483	.483	.437	.437	60
21	Sterling	Coast Guard 6-M-6	Tr, M, Ind	6-6 $\frac{1}{2}$ x7 $\frac{1}{2}$	93.7	300-1550	1426.8	4.13	986-1200	W	Se	L	Sil	1.87	1.87			.483	.483	.437	.437	60
22	Sterling	Viking II T-6	Tr, M, Ind	6-8x9	153.6	190-600	2714.3	3.93	1900-1000	W	Se	L	Sil	2.59	2.59			.555	.555	.582	.582	45
23	Sterling	Viking II T-6	Tr, M, Ind	6-8x9	153.6	300-900	2714.3	4.18	1900-1000	W	Se	L	Sil	2.59	2.59			.555	.555	.582	.582	45
24	Sterling	Viking II T-6	Tr, M, Ind	6-8x9	153.6	425-1200	2714.3	4.18	1900-1000	W	Se	L	Sil	2.59	2.59			.555	.555	.582	.582	45
25	Sterling	Dolphin-Med. GRM-8	Tr, M, Ind	8-5 $\frac{1}{2}$ x6 $\frac{1}{2}$	105.8	220-1200	1402.2	3.85	1055-1300	2	Se	L	Sil	1.87	1.87			.375	.375	.437	.437	60
26	Sterling	Dolphin 8-GR-8	Tr, M, Ind	8-5 $\frac{1}{2}$ x6 $\frac{1}{2}$	105.8	300-1550	1402.2	4.08	1055-1300	2	Se	L	Sil	1.87	1.87			.375	.375	.437	.437	60
27	Sterling	Viking II 8-T-8	Tr, M, Ind	8-8x9	204.8	250-600	3619.0	3.93	2520-1050	W	Se	L	Sil	2.59	2.59			.555	.555	.582	.582	45
28	Sterling	Viking II 8-T-8	Tr, M, Ind	8-8x9	204.8	400-900	3619.0	4.18	2520-1050	W	Se	L	Sil	2.59	2.59			.555	.555	.582	.582	45
29	Sterling	Viking II 8-T-8	Tr, M, Ind	8-8x9	204.8	565-1200	3619.0	4.18	2520-1050	W	Se	L	Sil	2.59	2.59			.555	.555	.582	.582	45
30	Thorobred.	K M	1-3 $\frac{1}{2}$ x4 $\frac{1}{2}$		5-1000	52.5	4.00		1	Se	L	CI	1.62	1.62	1.43	1.43	.300	.300	.375	.375	45	
31	Thorobred.	KK M	2-3 $\frac{1}{2}$ x4 $\frac{1}{2}$		10-1100	105.0	4.00		2	Se	L	CI	1.62	1.62	1.43	1.43	.300	.300	.375	.375	45	
32	Thorobred.	Meteor M	4-2 $\frac{1}{2}$ x3 $\frac{1}{2}$		18-2800	61.0	5.70		4	Se	L	CHS	1.12	.937	1.00	.812	.228	.250	.312	.312	45	
33	Thorobred.	DS M	4-2 $\frac{1}{2}$ x4		16-1800	95.0	4.66		4	In	L	Sil	1.46	1.34	1.31	1.04	.250	.250	.312	.312	45	
34	Thorobred.	Arrowhead Jr. M	4-3 $\frac{1}{2}$ x4		35-2500	133.0	5.60		4	In	L	CHS	1.34	1.34	1.04	1.04	.281	.281	.312	.312	45	
35	Thorobred.	Arrowhead M	4-3 $\frac{1}{2}$ x4 $\frac{1}{2}$		42-2250	186.0	4.70		4	In	L	Sil	1.56	1.56	1.37	1.37	.302	.302	.375	.375	45	
36	Thorobred.	AA M	4-3 $\frac{1}{2}$ x4 $\frac{1}{2}$		24-1400	210.0	4.00		2	Se	L	CI	1.62	1.62	1.43	1.43	.300	.300	.375	.375	45	
37	Thorobred.	F M	4-4 $\frac{1}{2}$ x5		36-1400	259.0	4.00		2	Se	L	CI	1.93	1.93	1.75	1.75	.300	.300	.375	.375	45	
38	Thorobred.	B M	4-4 $\frac{1}{2}$ x5		44-1800	318.0	4.00		4	Se	L	DC	2.09	2.09	1.93	1.93	.300	.300	.375	.375	45	
39	Thorobred.	BS-4 M	4-4 $\frac{1}{2}$ x6		56-1600	382.0	4.00		4	Se	L	CAI	2.34	2.34	2.12	2.12	.300	.300	.437	.437	45	
40	Thorobred.	BC-4 M	4-5x7		56-1200	550.0	4.00		2	Se	L	CAI	2.75	2.75	2.37	2.37	.375	.375	.625	.625	45	
41	Thorobred.	BCS-4 M	4-5 $\frac{1}{2}$ x7		71-1100	727.0	4.00		2	Se	L	CAI	2.75	2.75	2.37	2.37	.375	.375	.625	.625	45	
42	Thorobred.	BC-Super-4 M	4-6x7		78-1100	792.0	4.00		2	Se	L	CAI	2.75	2.75	2.37	2.37	.375	.375	.625	.625	45	
43	Thorobred.	Hiawatha M	6-3 $\frac{1}{2}$ x4 $\frac{1}{2}$		84-3000	282.0	5.70		6	In	L	Sil	1.68	1.43	1.50	1.25	.375	.375	.375	.375	45	
44	Thorobred.	Arrow Super-6 M	6-4 $\frac{1}{2}$ x4 $\frac{1}{2}$		90-2200	404.0	5.70		6	In	L	Sil	1.87	1.56	1.62	1.34	.312	.312	.375	.375	45	
45	Thorobred.	BB-6 M	6-4 $\frac{1}{2}$ x6		80-1725	572.5	4.00		6	Se	L	DC	2.34	2.34	2.12	2.12	.300	.300	.437	.437	45	
46	Thorobred.	BBS-6 M	6-5x6		101-1500	707.0	4.00		6	Se	L	DC	2.34	2.34	2.12	2.12	.300	.300	.437	.437	45	
47	Thorobred.	BC-6 M	6-5x7		90-1100	825.0	4.00		2	Se	L	CAI	2.75	2.75	2.37	2.37	.375	.375	.625	.625	45	
48	Thorobred.	BCS-6 M	6-5 $\frac{1}{2}$ x7		112-1100	1091.0	4.00		2	Se	L	CAI	2.75	2.75	2.37	2.37	.375	.375	.625	.625	45	
49	Thorobred.	BC-Super-6 M	6-6x7		124-1100	1187.5	4.00		2	Se	L	CAI	2.75	2.75	2.37	2.37	.375	.375	.625	.625	45	
50	Universal	W M	1-4 $\frac{1}{2}$ x4 $\frac{1}{2}$		8-1200	67.6	4.60		1	In	L	CNS	1.87	1.87			.250	.250	.375	.375	45	
51	Universal	AFT M	2-3x3 $\frac{1}{2}$		10-2000	49.5	5.75		2	In	L	CNS	1.50	1.50			.250	.250	.375	.375	45	
52	Universal																					

COMMERCIAL VEHICLE ENGINES—continued

Front Drive—Type	PISTONS				Number of Rings per Piston	CONNECTING RODS			CRANKSHAFT						SPARK PLUG		CARBUR-ETOR		Adapted for Use of Kerosene or Distillate	Weight (Without Carburetor or Ignition)—Lbs.	OVERALL DIMENSIONS (In.)			Line Number	
	Material	Length (In.)	Weight (with Pins, Rings and Bushing)—(Oz.)	Piston Pin—Diameter and Length (In.)		Material	Center to Center Length (In.)	Weight—With Bushing and Cap (Oz.)	Material	Counterbalances Used	Crank-pin Diameter and Length (In.)	Main Bearings		Oil Pressure To	Recommended Make	Thread Size	Make	Size			Width	Height	Length		
												Number	Diameter and Length (In.)												
													Front	Rear											
HG	CI	6.25	1.37x5.37	4	AS	15 1/2	96	CNS	N	2.62x3.00	7	2.62x3.00	2.62x3.00	abede	CH	7/8-18	Str	2	No	2025	29 1/2	39 1/2	88 1/2	1	
HG	CI	6.25	1.37x5.37	4	AS	15 1/2	96	CNS	N	2.62x3.00	7	2.62x3.00	2.62x3.00	abede	CH	7/8-18	Str	2	No	2200	28 1/2	45 1/2	88 1/2	2	
HG	CI	6.12	1.37x5.37	6	AS	15 1/2	96	CNS	N	2.62x3.00	7	2.62x3.00	2.62x3.00	abede	CH	7/8-18	Str	2	No	2100	28 1/2	39 1/2	88 1/2	3	
HG	CI	8.25	1.62x6.37	4	AS	20 1/2	96	CNS	N	2.87x3.62	7	2.87x3.62	2.87x3.62	abede	CH	7/8-18	Str	2	No	4800	38 1/2	48 1/2	103 1/2	4	
HG	CI	7.00	1.87x5.50	4	AS	19 1/2	96	CNS	N	3.50x4.12	7	3.50x4.12	3.50x4.12	abede	CH	7/8-18	Hol(2)	2	No	4000	36 1/2	55 1/2	111 1/2	5	
HG	CI	6.00	1.25x5.12	4	CS	12 1/2	96	CNS	Y	2.25x2.62	3	2.25x4.62	2.25x4.75	Splash	CH	1/2 pipe	Sch	1 1/2	No	1100	24 1/2	36 1/2	53 1/2	6	
HG	AI	5.50	1.43x4.37	4	CS	12 1/2	113	CNS	Y	2.50x2.12	7	3.00x1.75	3.00x2.87	abedef	CH	7/8-18	Zen(2)	1 1/2	No	1400	27 1/2	33 1/2	71 1/2	7	
HG	AI	5.50	1.43x4.37	4	CS	12 1/2	113	CNS	Y	2.50x2.12	7	3.00x1.75	3.00x2.87	abedef	CH	7/8-18	Zen(2)	1 1/2	No	1400	27 1/2	33 1/2	71 1/2	8	
HG	AI	5.50	1.43x4.37	4	CS	12 1/2	113	CNS	Y	2.50x2.12	7	3.00x1.75	3.00x2.87	abedef	CH	7/8-18	Zen(2)	1 1/2	No	1850	27 1/2	33 1/2	71 1/2	9	
HG	AI	5.50	1.43x4.37	4	CS	12 1/2	113	CNS	Y	2.50x2.12	7	3.00x1.75	3.00x2.87	abedef	CH	7/8-18	Zen(2)	1 1/2	No	1400	27 1/2	33 1/2	71 1/2	10	
HG	AI	5.50	1.43x4.37	4	CS	12 1/2	113	CNS	Y	2.50x2.12	7	3.00x1.75	3.00x2.87	abedef	CH	7/8-18	Zen(2)	1 1/2	No	2000	27 1/2	33 1/2	71 1/2	11	
HG	AI	5.50	1.43x4.37	4	CS	12 1/2	113	CNS	Y	2.50x2.12	7	3.00x1.75	3.00x2.87	abedef	CH	7/8-18	Zen(2)	1 1/2	No	2000	27 1/2	33 1/2	71 1/2	12	
HG	AI	5.50	1.43x4.37	4	CS	12 1/2	113	CNS	Y	2.50x2.12	7	3.00x1.75	3.00x2.87	abedef	CH	7/8-18	Zen(2)	1 1/2	No	2000	27 1/2	33 1/2	71 1/2	13	
HG	CI	6.00	1.43x4.37	4	CS	14	130	CNS	Y	2.50x3.00	4	2.50x4.43	2.50x4.43	abedef	CH	7/8-18	Zen(2)	1 1/2	No	2000	30 1/2	35 1/2	87 1/2	14	
HG	CI	6.00	1.43x4.37	4	CS	14	130	CNS	Y	2.50x3.00	4	2.50x4.43	2.50x4.43	abedef	CH	7/8-18	Zen(2)	1 1/2	No	2000	30 1/2	35 1/2	87 1/2	15	
HG	CI	6.00	1.43x4.37	4	CS	14	130	CNS	Y	2.50x3.00	4	2.50x4.43	2.50x4.43	abedef	CH	7/8-18	Zen(2)	1 1/2	No	2000	30 1/2	35 1/2	87 1/2	16	
HG	AI	5.81	1.25x5.12	3	CS	14	130	CNS	Y	2.50x3.00	4	2.50x4.43	2.50x4.43	abedef	CH	7/8-18	Zen(2)	1 1/2	No	2000	30 1/2	35 1/2	87 1/2	17	
HG	AI	6.06	1.25x5.12	3	CS	14	130	CNS	Y	2.50x3.00	4	2.50x4.43	2.50x4.43	abedef	CH	7/8-18	Zen(2)	1 1/2	No	2250	30 1/2	45 1/2	87 1/2	18	
HG	AI	6.46	1.25x5.12	3	CS	14	130	CNS	Y	2.50x3.00	4	2.50x4.43	2.50x4.43	abedef	CH	7/8-18	Zen(2)	1 1/2	No	2000	30 1/2	45 1/2	87 1/2	19	
HG	AI	6.06	1.25x5.12	3	CS	14 1/2	224	CNS	Y	3.00x3.12	7	3.25x2.62	3.25x3.68	abedef	CH	7/8-18	SZ(2)	2 1/2	No	4000	31	49 1/2	102	20	
HG	AI	6.42	1.25x5.12	3	CS	14 1/2	224	CNS	Y	3.00x3.12	7	3.25x2.62	3.25x3.68	abedef	CH	7/8-18	SZ(2)	2 1/2	No	3400	31	49 1/2	102	21	
HG	AI	8.00	2.00x7.00	4	CS	18	416	CNS	Y	4.00x3.12	7	4.00x3.37	4.00x5.50	abedef	CH	7/8-18	Zen(3)	2 1/2	No	7100	40 1/2	72 1/2	121 1/2	22	
HG	AI	8.25	2.00x7.00	4	CS	18	416	CNS	Y	4.00x3.12	7	4.00x3.37	4.00x5.50	abedef	CH	7/8-18	Zen(3)	2 1/2	No	7100	40 1/2	72 1/2	121 1/2	23	
HG	AI	8.93	2.00x7.00	4	CS	18	416	CNS	Y	4.00x3.12	7	4.00x3.37	4.00x5.50	abedef	CH	7/8-18	Zen(3)	2 1/2	No	7100	40 1/2	72 1/2	121 1/2	24	
HG	AI	5.81	1.25x5.12	3	CS	14	130	CNS	Y	2.50x3.00	5	2.50x4.43	2.50x4.43	abedef	CH	7/8-18	Zen(2)	1 1/2	No	3400	30 1/2	45 1/2	104 1/2	25	
HG	AI	6.06	1.25x5.12	3	CS	14	130	CNS	Y	2.50x3.00	5	2.50x4.43	2.50x4.43	abedef	CH	7/8-18	Zen(2)	1 1/2	No	3400	30 1/2	45 1/2	104 1/2	26	
HG	AI	8.00	2.00x7.00	4	CS	18	416	CNS	Y	4.00x3.12	9	4.00x3.37	4.00x5.50	abedef	CH	7/8-18	Zen(4)	2 1/2	No	9000	40 1/2	72 1/2	142 1/2	27	
HG	AI	8.25	2.00x7.00	4	CS	18	416	CNS	Y	4.00x3.12	9	4.00x3.37	4.00x5.50	abedef	CH	7/8-18	Zen(4)	2 1/2	No	9000	40 1/2	72 1/2	142 1/2	28	
HG	AI	8.93	2.00x7.00	4	CS	18	416	CNS	Y	4.00x3.12	9	4.00x3.37	4.00x5.50	abedef	CH	7/8-18	Zen(4)	2 1/2	No	9000	40 1/2	72 1/2	142 1/2	29	
HG	CI	4.12	64.0	1.10x3.25	3	CS	8 1/2	43	CS	N	1.50x2.12	2	1.50x3.00	1.50x3.00	Splash	AC	7/8-18	Str	1	K	210	19 1/2	22 1/2	31 1/2	30
HG	CI	4.12	64.0	1.10x3.25	3	CS	8 1/2	43	CS	N	1.50x2.12	2	1.50x3.00	1.50x3.00	Splash	AC	7/8-18	Str	1	K	415	19 1/2	22 1/2	31 1/2	31
HG	CI	2.37	10.0	.625x2.12	3	CS	6	14	CS	N	1.43x1.25	2 1/2	ND1207 xl	ND1207 xl	ce	AC	14 mm.	Zen	1	K	240	18 1/2	19 1/2	27 1/2	32
HG	CI	3.00	19.0	.625x2.40	3	CS	8	27	CS	N	1.75x1.50	2	1.75x2.81	1.75x2.87	abede	AC	7/8-18	Str	1	K	330	15 1/2	21 1/2	38 1/2	33
HG	CI	3.50	30.0	.875x2.62	3	CS	7 1/2	29	CS	N	1.75x1.25	3	2.12x1.43	2.12x1.18	abede	AC	18 mm.	Str	1	K	490	21 1/2	24 1/2	35	34
HG	CI	3.93	45.0	1.10x3.06	4	CS	8 1/2	46	CS	N	2.00x1.50	3	2.00x2.50	2.00x1.87	abede	AC	7/8-18	Str	1	K	610	19 1/2	26 1/2	41	35
HG	CIA	4.12	64.0	1.10x3.25	3	CS	8 1/2	43	CS	N	1.50x2.12	3	1.50x3.00	1.50x3.00	abede	AC	7/8-18	Str	1	K	620	19 1/2	22 1/2	46 1/2	36
HG	CIA	4.75	69.0	1.10x3.56	4	CS	10 1/2	66	CS	N	2.00x2.25	3	2.00x4.18	2.00x3.50	abede	AC	7/8-18	Str	1 1/2	K	830	20 1/2	26 1/2	54 1/2	37
HG	CIA	4.75	69.0	1.10x3.56	4	CS	10 1/2	66	CS	N	2.00x2.25	3	2.00x4.18	2.00x3.50	abede	AC	7/8-18	Str	1 1/2	K	830	20 1/2	26 1/2	54 1/2	38
HG	CIA	5.25	82.0	1.25x3.87	4	CS	11 1/2	87	CS	N	2.56x2.25	5	2.56x4.25	2.56x4.25	abede	AC	7/8-18	Str	1 1/2	K	1175	22 1/2	27 1/2	59 1/2	39
HG	CIA	6.00	126.0	1.43x4.68	4	CS	13 1/2	168	CS	N	2.56x3.00	5	2.62x4.50	2.62x4.50	abede	AC	7/8-18	Str	2	K	1720	25 1/2	35 1/2	74 1/2	40
HG	CIA	6.00	150.0	1.43x5.25	4	CS	13 1/2	168	CS	N	2.56x3.00	5	2.62x4.50	2.62x4.50	abede	AC	7/8-18	Str	2	K	1730	25 1/2	35 1/2	74 1/2	41
HG	CIA	6.00	190.0	1.43x5.50	4	CS	13 1/2	168	CS	N	2.56x3.00	5	2.62x4.50	2.62x4.50	abede	AC	7/8-18	Str	2	K	1740	25 1/2	35 1/2	74 1/2	42
HG	AI	4.37	37.0	1.00x3.00	4	CS	8	40	CS	N	2.00x1.50	7	2.62x2.00	2.62x1.25	abede	AC	18 mm.	Str	1 1/4	K	1000	22 1/2	28 1/2	53 1/2	43
HG	AI	4.37	78.0	1.00x4.00	4	CS	8 1/2	48	CS	N	2.25x1.50	7	2.62x2.75	2.62x1.62	abede	AC	14 mm.	Str	1 1/4	K	1185	20 1/2	27 1/2	57 1/2	44
HG	CIA	5.25	82.0	1.25x3.87	4	CS	11 1/2	87	CS	N	2.56x2.25	7	2.56x4.25	2.56x4.25	abede	AC	7/8-18	Str	1 1/2	K	1475				

AMERICAN STOCK, MARINE AND

Line Number	MAKE AND MODEL	Designed for	Number of Cylinders Bore and Stroke (In.)	Rated Hp. (A.M.A.)	Maximum Brake Hp. at Specified R.P.M.	Piston Displacement (Cu. In.)	Compression Ratio	Maximum Torque at R.P.M. (Lb. Ft.)	No. of Cylinders Cast In One Piece	Crankcase—Upper Half Integral with Cylinders	Arrangement	Exhaust Head Material or S.A.E. No.	VALVES								Seat Angle (Degrees)	
													Max. Head Diameter (In.)		Min. Port Diameter (In.)		Lift (In.)		Stem Diameter (In.)			
													Intake	Exhaust	Intake	Exhaust	Intake	Exhaust	Intake	Exhaust		
1	Wisconsin	AM-4	Tr, Ind	4-3 1/2 x 4	16.9	28-2230	132.0	4.60	79-1301	4	Se	I	Sil	1.50	1.37	1.31	1.18	.276	.255	.312	.312	45
2	Wisconsin	AP-4	Tr, Ind	4-3 1/2 x 4	19.6	31-2230	154.0	4.60	96-1100	4	Se	I	Sil	1.50	1.37	.937	1.18	.276	.256	.312	.312	45
3	Wisconsin	SU	Tr, Ind	4-4 x 5	25.6	38-1600	251.0	4.20	160-1000	4	In	I	Sil	1.68	1.68	1.53	1.53	.438	.379	.375	.375	45
4	Wisconsin	W	T, Tr, Ind	4-4 1/2 x 5	27.2	42-1600	267.0	4.15	182-950	4	In	I	Sil	1.68	1.68	1.53	1.53	.438	.379	.375	.375	45
5	Wisconsin	X	T, Tr, Ind	4-4 1/2 x 5	32.4	65-1900	318.0	4.25	224-1000	4	In	I	Sil	2.00	2.00	1.81	1.81	.394	.393	.437	.437	45
6	Wisconsin	N	T, Tr	6-3 1/2 x 4 1/2	29.4	55-2600	245.0	4.50	163-650	6	In	I	Sil	1.65	1.65	1.50	1.50	.382	.382	.375	.375	45
7	Wisconsin	GA-1	T, Tr, Ind	6-3 3/4 x 5	31.5	44-1600	309.0	4.85	196-675	6	In	I	Sil	1.71	1.71	1.50	1.50	.379	.379	.375	.375	45
8	Wisconsin	GA-2	T, Tr, Ind	6-3 3/4 x 5	33.7	49-1600	331.0	4.50	211-700	6	In	I	Sil	1.71	1.71	1.50	1.50	.379	.379	.375	.375	45
9	Wisconsin	L-2	T, Tr, Ind	6-3 3/4 x 5	36.0	62-1800	354.0	4.27	236-700	6	In	I	Sil	2.00	2.00	1.75	1.75	.379	.379	.434	.434	45
10	Wisconsin	L-3	T, Tr, Ind	6-4 1/2 x 5	40.8	68-1800	401.0	4.30	260-700	6	In	I	Sil	2.00	2.00	1.75	1.75	.379	.379	.434	.434	45
11	Wisconsin	L-4	T, Ind	6-4 1/2 x 5	43.3	71-1800	425.0	4.26	280-650	6	In	I	Sil	2.00	2.00	1.75	1.75	.379	.379	.439	.439	45
12	Wisconsin	ZA-1	Tr, Ind	6-4 1/2 x 5	48.6	78-1600	477.0	4.50	322-800	6	Se	I	Sil	2.25	2.25	2.06	2.06	.450	.450	.437	.437	45
13	Wisconsin	ZA-2	Tr, Ind	6-4 1/2 x 5	51.3	82-1600	504.0	4.88	340-750	6	Se	I	Sil	2.25	2.25	2.06	2.06	.450	.450	.437	.437	45

ABBREVIATIONS

†—Intake, Tungsten Steel, Exhaust, Silerome Steel
 §—Weight complete
 *—Pressure stream to Connecting Rods and Timing Gears
 **—Pressure also to Camshaft Thrust Bearing
 ■—Also available in reduction gear models
 *—Also available in R. H. rotation
 ‡—Tocco hardened
 ▲—Ball Bearings used
 †—Cast Iron Pistons also supplied

★—Also made in 4 cylinder model
 φ—Weight per pair
 (1)—Liners use in cylinders
 (2)—Two used (3)—Three used
 (4)—Four used
 (5)—Natural gas fuel equipment, or combination natural gas and gasoline equipment available
 (6)—Also built in 4 and 6 cylinder models
 a—Main Bearings
 (aa)—Forked Rod, 88 oz., Plain Rod 50 oz.
 AC—AC Spark Plug
 Al—Aluminum Alloy
 Ala—Aluminum Alloy, anodized

Als—Aluminum Alloy with Steel Strut
 AS—Alloy Steel
 Au—Auto-Lite
 AUS—Austenitic Steel
 b—Connecting Rod Bearings
 (bb)—Master Rod and Pin, 163 oz., Link Rod, 55 oz.
 B—Buses BG—Bevel Gear
 Bos—Bosch Spark Plug
 B—Ti-Ball or Timken Roller Bearings
 c—Camshaft Bearings
 C—Cars
 CA—Champion or AC Spark Plugs
 CAI—Chrome Aluminum

Car—Carter Carburetor
 CAS—Cast Alloy Steel
 Ch—Chain
 CH—Champion Spark Plug
 CHS—Chrome Nickel Silicon Steel
 CI—Cast Iron
 CIA—Cast Iron Anodized
 CNS—Chrome Nickel Steel
 CNT—Chrome Nickel Steel with Tungsten
 CS—Carbon Steel
 CT—Cast Iron, Tin Plated
 CV—Chrome Vanadium
 d—Wrist Pins
 D—Distillate DC—Diachrome

AMERICAN TWO-CYCLE OUTBOARD MOTORS

MAKE AND MODEL	Power Head	No. of Cylinders	Bore and Stroke (In.)	Piston Displacement (Cu. In.)	N.O.A. Certified Brake Hp.	R.P.M.	Weight (Lb.)	Piston Rings No. and Size	Propeller Diameter and Pitch (In.)	Starting Device	Fuel Tank Capacity (Gal.)	Gear Ratio	Ignition System Type	Carburetor Make and Size	Spark Plug Make and Model	Type of Exhaust	Cooling System
Clark Troller	T-39 Single	1	1 1/2 x 1 1/2	2.65	...	...	...	2-3/8	...	Cord	0.25	...	Battery	...	Ch-V-1	...	(a)
Clark Troller	TT-39 Twin	2	1 1/2 x 1 1/2	5.30	...	...	...	2-3/8	...	Cord	0.31	...	Battery	...	Ch-V-1	...	(a)
Eclipse (1)	SMD	RV-2 Port	1 1/2 x 1 1/2	5.00	2.50	3300	27.0	3-3/8	7 1/2 x 5	Cord	0.57	12-19	Magneto	Str-3/4	Ch-J10	Underwater	Air
Eclipse (1)	TMD	RV-2 Port	2 1/2 x 1 1/2	10.00	4.50	4000	41.0	3-3/8	8 1/4 x 6	Cord	0.95	12-19	Magneto	Str-3/4	Ch-J10	Underwater	Air
Elito (2)	CUB	Ch.V-2 Port	1 1/2 x 1	1.00	.50	4000	9.0	2-3/8	5 1/2 x 4 3/4	Cord	0.12	12-25	Magneto	Own	Ch-J4	Underwater	Pump
Elito (2)	PAL	Ch.V-2 Port	1 1/2 x 1 1/2	2.00	1.10	3750	14.0	2-3/8	6x5	Cord	0.20	13-20	Magneto	Own	Ch-J8	Underwater	Pump
Elito (2)	ACE	Ch.V-2 Port	1 1/2 x 1 1/2	3.75	1.80	3500	23.0	2-3/8	7x6	Cord	0.43	13-20	Magneto	Own	Ch-C7	Underwater	Pump
Elito (2)	Handitwin	Ch.V-2 Port	2 1/2 x 1 1/2	6.60	3.00	3500	32.0	2-3/8	7 1/2 x 6	Cord	0.43	13-20	Magneto	Own	Ch-C7	Underwater	Pump
Elito (2)	Lightwin	Ch.V-2 Port	2 1/2 x 1 1/2	10.00	5.00	3500	40.0	2-1/2	7 1/2 x 8	Cord	0.50	11-17	Magneto	Own	Ch-M6	Underwater	Pump
Elito (2)	Fleetwin	RV-2 Port	2 1/2 x 1 1/2	15.00	8.50	4000	66.0	2-1/2	9x8 1/4	Cord	1.12	13-19	Magneto	Own	Ch-M7	Underwater	Pump
Evinrude	Mate	Ch.V-2 Port	1 1/2 x 1	1.00	.50	4000	10.0	2-3/8	5 1/2 x 4 3/4	Cord	0.12	12-25	Magneto	Own	Ch-J4	Underwater	Pump
Evinrude	Ranger	Ch.V-2 Port	1 1/2 x 1 1/2	2.00	1.10	3750	16.0	2-3/8	6x5	Cord	0.50	13-20	Magneto	Own	Ch-J8	Underwater	Pump
Evinrude	Sportsman	Ch.V-2 Port	1 1/2 x 1 1/2	3.75	2.00	3500	25.0	2-3/8	7x6	Cord	0.50	13-20	Magneto	Own	Ch-J8	Underwater	Pump
Evinrude	Sportwin	Ch.V-2 Port	2 1/2 x 1 1/2	6.60	3.30	3500	35.0	2-3/8	7 1/2 x 6	Cord	0.75	13-20	Magneto	Own	Ch-J8	Underwater	Pump
Evinrude	Fisherman	Ch.V-2 Port	2 1/2 x 1 1/2	10.00	5.40	3500	45.0	2-1/2	7 1/2 x 8	Cord	0.75	13-20	Magneto	Own	Ch-M6	Underwater	Pump
Evinrude	Weedless Fish'n	Ch.V-2 Port	2 1/2 x 1 1/2	10.00	5.40	3500	49.0	2-1/2	7 1/2 x 8	Cord	0.75	13-20	Magneto	Own	Ch-M6	Underwater	Pump
Evinrude	Lightfour	RV-2 Port	4 1/2 x 1 1/2	15.00	9.30	4000	60.0	3-3/8	8 1/2 x 9	Cord	1.25	11-17	Magneto	Own	Ch-M5	Underwater	Pump
Evinrude	Sportfour	RV-2 Port	4 1/2 x 2	25.00	16.20	4000	95.0	3-3/8	9 1/2 x 9 1/2	Cord	2.00	13-19	Magneto	Own	Ch-M5	Underwater	Pump
Evinrude	Speeditwin	RV-2 Port	2 1/2 x 2 1/2	30.00	22.50	4000	110.0	2-1/2	10 1/2 x 10 1/2	Cord	2.50	15-21	Magneto	Own	Ch-M5	Underwater	Pump
Evinrude	Speedifour	RV-2 Port	4 1/2 x 2 1/2	50.00	33.40	4000	140.0	2-1/2	10 1/2 x 13	Cord	4.00	15-21	Magneto	Own	Ch-M5	Underwater	Pump
Evinrude	Midget Racer	RV-2 Port	2 1/2 x 1 1/2	7.50	6.00	5000	37.5	3-3/8	6 1/2 x 8 1/2	Cord	1.25	13-20	Magneto	Own	Ch-R1	Muffler	Pump
Evinrude	Racing Speeditwin	RV-2 Port	2 1/2 x 2 1/2	30.00	...	...	97.0	2-1/2	9 1/2 x 14	Cord	2.50	13-19	Battery	Vac	Ch-R11S	Open Stacks	Pump
Evinrude	Racing 460	RV-2 Port	4 1/2 x 2 1/2	60.00	...	...	140.0	2-1/2	10 1/2 x 18	Cord	4.00	13-19	Battery	Vac	Ch-R11S	Open Stacks	Pump
Johnson	AT-39	RV-3 Port	2 1/2 x 1 1/2	8.80	5.00	4000	39.5	3-3/8	8x7 1/2	RP	0.66	14-25	Magneto	Own	Ch-J8	Underwater	Pump
Johnson	LT-39	CRV-3 Port	2 1/2 x 1 1/2	8.80	5.00	4000	35.0	3-3/8	8x7 1/2	Cord	0.66	14-25	Magneto	Own	Ch-J8	Underwater	Pump
Johnson	DT-39	CRV-3 Port	2 1/2 x 1 1/2	8.80	5.00	4000	44.0	3-3/8	8x7 1/2	RP	0.75	14-25	Magneto	Own	Ch-J8	Underwater	Pump
Johnson	HS-39	CRV-3 Port	2 1/2 x 1 1/2	4.08	2.50	4000	25.5	2-3/8	6 1/2 x 5 1/4	Cord	0.41	13-20	Magneto	Own	Ch-J8	Underwater	Pump
Johnson	HD-39	CRV-3 Port	2 1/2 x 1 1/2	4.08	2.50	4000	32.0	2-3/8	6 1/2 x 5 1/4	RP	0.47	13-20	Magneto	Own	Ch-J8	Underwater	Pump
Johnson	HA-39	CRV-3 Port	2 1/2 x 1 1/2	4.08	2.50	4000	30.0	2-3/8	6 1/2 x 5 1/4	RP	0.41	13-20	Magneto	Own	Ch-J8	Underwater	Pump
Johnson	MS-39	NV-3 Port	1 1/2 x 1 1/2	2.04	1.10	4000	17.0	2-3/8	6 1/2 x 3 1/4	Cord	0.23	13-20	Magneto	Own	Ch-J8	Underwater	Pump
Johnson	MD-39	NV-3 Port	1 1/2 x 1 1/2	2.04	1.10	4000	21.0	2-3/8	6 1/2 x 3 1/4	RP	0.29	13-20	Magneto	Own	Ch-J8	Underwater	Pump
Johnson	KA-39	RV-2 Port	2 1/2 x 1 1/2	13.96	9.80	4000	64.0	3-1/8	9 1/2 x 9	Cord	1.62	14-24	Magneto	Own-1 1/2	Ch-M5	Underwater	Pre.Vac
Johnson	PO-39	RV-2 Port	2 1/2 x 2.52	29.92	22.00	4000	109.0	3-1/8	12x13	Cord	2.50	12-21	Magneto	Vac-2	Ch-R7	Underwater	Pre.Vac
Neptune (3)	1A-39	NV-2 Port	1 1/2 x 1 1/2	2.64	1.20	3000	17.0	3-1/8	6x5	Cord	0.25	13-20	Magneto	Til	Ch-J8	Underwater	Pump
Neptune (3)	2A-39	NV-3 Port	1 1/2 x 1 1/2	5.00	2.00	2800	30.0	3-1/8	7 1/2 x 5 1/2	Cord	0.50	14-21	Magneto	Til	Ch-M6	Underwater	Pump
Neptune (3)	4A-39	NV-3 Port	2 1/2 x 1 1/2	10.00	4.00	3000	40.0	3-1/8	8x7	Cord	1.00	14-21	Magneto	Til	Ch-H10	Underwater	Pump
Neptune (3)	5A-39	NV-3 Port	2 1/2 x 1 1/2	10.00	5.00	3600	50.0	3-1/8	8x7	Cord	1.00	14-21	Magneto	Til	Ch-H10	Underwater	Pump
Neptune (3)	6A-39	NV-3 Port	2 1/2 x 1 1/2	10.00	6.00	3400	50.0	3-1/8	8x7	Cord	1.00	14-21	Magneto	Til	Ch-H10	Underwater	Pump
Neptune (3)	9A-39	NV-3 Port	2 1/2 x 2	15.80	9.00	4000	62.0	3-1/8	9x9	Cord	1.00	12-21	Magneto	Til	Ch-H10	Underwater	Pump

ABBREVIATIONS

(1)—Bendix Aviation Corp.—Marine Div.
 (2)—Evinrude Motors
 (3)—Muncie Gear Works
 (a)—Direct immersion of cylinder in water

Ch—Champion Spark Plug
 Ch.V—Check Valve
 CRV—Combination Rotary and Valveless
 NV—Valveless

Pre.Vac—Pressure Vacuum
 RP—Ready Pull
 RV—Rotary Valve

Str—Stromberg Carburetor
 Til—Tillotson Carburetor
 Vac—Vacturi Carburetor

COMMERCIAL VEHICLE ENGINES—concluded

Front End Drive Type	PISTONS				Number of Rings per Piston	CONNECTING RODS		CRANKSHAFT				SPARK PLUG		CARBU-RETOR		Adapted for Use of Kerosene or Distillate	Weight (Without Carburetor or Ignition)—Lb.	OVERALL DIMENSIONS (In.)			Line Number				
	Material	Length (In.)	Weight (with Pins, Rings and Bushing)—(Oz.)	Piston Pin—Diameter and Length (In.)		Material	Center to Center Length (In.)	Weight—With Bushing and Cap (Oz.)	Material	Counterbalances Used	Crank-pin Diameter and Length (In.)	Main Bearings		Oil Pressure To	Recommended Make			Thread Size	Make	Size		Width	Height	Length	
												Number	Diameter and Length (In.)												
													Front	Rear											
HG	Al	3.75	.....	.937x2.62	4	CS	8 3/4	.....	CS	Y	1.75x1.25	3	Tim	Tim	ag	CH	18 mm.	Zen	1	No	440	20	29	36 1/2	1
HG	Al	3.75	.....	.937x2.87	4	CS	8 3/4	.....	CS	Y	1.75x1.25	3	Tim	Tim	ag	CH	18 mm.	Zen	1	No	440	20	29	36 1/2	2
HG	CI	4.25	49.7	1.06x3.47	3	CS	10 1/2	64	CS	N	2.00x2.00	3	1.93x2.50	2.03x3.00	abdeg	CH	7/8-18	Str	1 1/4	No	615	25 3/4	34 3/4	35 1/4	3
HG	CI	4.15	50.2	1.06x3.47	3	CS	10 1/2	65	CS	N	2.37x2.00	3	2.37x2.50	2.37x3.00	abdeg	CH	7/8-18	Str	1 1/4	No	640	25 3/4	34 3/4	35 1/4	4
HG	CI	4.75	117.7	1.18x3.93	5	CS	10 1/2	118.7	CS	N	2.75x2.50	3	2.75x3.00	2.75x3.00	abdeg	CH	7/8-18	Str	1 1/2	No	850	25 3/4	36 1/4	47	5
HG	CI	4.00	43.7	1.06x2.84	3	CS	9	54	CS	N	2.25x1.75	4	2.25x2.50	2.25x3.00	abeg	CH	7/8-18	Str	1 1/4	No	820	25 3/4	32 3/4	45	6
HG	CI	4.00	48.0	1.06x3.09	3	CS	10 1/2	68	CS	N	2.50x1.75	4	2.50x2.50	2.50x3.00	abdeg	CH	7/8-18	Str	1 1/2	No	955	25 3/4	36 1/4	45	7
HG	CI	3.90	53.0	1.06x3.09	3	CS	10 1/2	68	CS	N	2.50x1.75	4	2.50x2.50	2.50x3.00	abdeg	CH	7/8-18	Str	1 1/2	No	975	25 3/4	36 1/4	45	8
HG	CI	4.87	66.0	1.25x3.14	3	CS	10 1/2	75	CS	N	2.62x1.75	4	2.75x2.25	2.75x2.75	abdeg	CH	7/8-18	Str	1 1/2	No	1075	25 3/4	37 1/4	53 3/4	9
HG	CI	4.71	71.0	1.25x3.39	4	CS	10 1/2	75	CS	N	2.62x1.75	4	2.75x2.25	2.75x2.75	abdeg	CH	7/8-18	Str	1 1/2	No	1095	25 3/4	37 1/4	53 3/4	10
HG	CI	4.62	80.7	1.25x3.39	4	CS	10 1/2	75	CS	N	2.62x1.75	4	2.75x2.25	2.75x2.75	abdeg	CH	7/8-18	Str	1 1/2	No	1110	25 3/4	37 1/4	53 3/4	11
HG	CI	4.75	55.7	1.18x3.93	4	CS	10 1/2	118.7	CS	N	2.75x2.50	4	2.75x3.00	2.75x3.00	abdeg	CH	7/8-18	Str	1 1/2	No	1280	25 3/4	37 1/4	60 1/4	12
HG	CI	4.68	119.7	1.18x3.93	4	CS	10 1/2	118.7	CS	N	2.75x2.50	4	2.75x3.00	2.75x3.00	abdeg	CH	7/8-18	Str	1 1/2	No	1270	25 3/4	37 1/4	60 1/4	13

- DFS—Drop Forged Steel
e—Timing Gears
Ext—Extruded Steel
f—Accessories Drive
F—In Head and Side ("F" Head)
FA—Fire Apparatus
g—Rocker Arm Bearings
(h)—Intake 30°, Exhaust 45°
(H)—Horizontal Motor
HB—Horizontal in Block (Valves)
HC—Helical Gear and Chain
HG—Helical Gear
HH—Horizontal in Head (Valves)
Hol—Holley Carburetor
- Dur—Duralumin
I—In Head (Valves)
In—Integral
Ind—Industrial
(k)—850-1550 RPM
K—Kerosene
K-D—Kerosene or Distillate
L—Valves at Side (L-Head)
(m)—900-2000 RPM
M—Marine (Engine Type)
May—Mayer Carburetor
ML—McCord Lubricator System
MS—Mack Stabl-ite Steel
N—No or None
NS—Nickel Steel
- Op—Optional
PU—Power Units
r—Reverse Gear
RC—Rail Cars
S—Steel
SB—Spiral Bevel Gear
SBG—Spur and Bevel Gear
Sch—Schebler Carburetor
Se—Separate
SG—Spur Gear
Sho—Shore Carburetor
Sil—Silchrome Steel
Spec—Special
SS—Semi-Steel
- Str—Stromberg Carburetor
SZ—Schebler and Zenith Carburetor
t—Tappets
T—Valves opposite ("T" Head)
T—Trucks
Ta—Taxicabs
Til—Tillotson Carburetor
Tim—Timken Bearings
Tun—Tungsten Steel
TZ—Tillotson or Zenith Carburetor
W—Block cast in one piece, removable wet liners used
Y—Yes
Zen—Zenith Carburetor

Census of Numbered Motorboats*

January 1, 1939

District	Symbol No.	Total	District	Symbol No.	Total
Baltimore, Md.	13	15,023	Norfolk, Va.	14	9,549
Boston, Mass.	4	10,003	Ogdensburg, N. Y.	7	5,371
Bridgeport, Conn.	6	6,054	Omaha, Neb.	46	452
Buffalo, N. Y.	9	4,604	Pembina, N. D.	34	92
Charleston, S. C.	16	1,203	Philadelphia, Pa.	11	13,841
Chicago, Ill.	39	4,202	Pittsburgh, Pa.	12	1,679
Cleveland, Ohio	41	8,222	Port Arthur, Tex.	21	1,743
Denver, Colo.	47	3	Portland, Me.	1	7,951
Des Moines, Iowa	44	1,343	Portland, Ore.	29	6,563
Detroit, Mich.	38	11,354	Providence, R. I.	5	2,780
Duluth, Minn.	36	1,697	Rochester, N. Y.	8	4,478
Galveston, Tex.	22	4,174	St. Albans, Vt.	2	1,716
Great Falls, Mont.	33	13	St. Louis, Mo.	45	5,592
Honolulu, T. H.	32	1,490	St. Thomas, V. I.	51	41
Indianapolis, Ind.	40	1,101	San Antonio, Tex.	23	2,006
Juneau, Alaska	31	3,825	San Diego, Cal.	25	878
Los Angeles, Cal.	27	4,835	San Francisco, Cal.	28	10,145
Louisville, Ky.	42	1,930	San Juan, P. R.	49	248
Memphis, Tenn.	43	2,728	Savannah, Ga.	17	1,427
Milwaukee, Wis.	37	5,466	Seattle, Wash.	30	13,369
Minneapolis, Minn.	25	2,182	Tampa, Fla.	18	12,979
Mobile, Ala.	19	3,049	Wilmington, N. C.	15	4,590
New Orleans, La.	20	8,871			
New York, N. Y.	10	29,188	Total		240,050

*Bureau of Marine Inspection and Navigation, Dept. of Commerce.

AMERICAN AIRCRAFT ENGINES

ENGINE MAKE AND MODEL	CYLINDER DATA						RATINGS										Weight (Lb.)		Car-bu- rat-ors	Ignition System		Starting	Installation Dimensions (In.)		Height Above Engine Bed (In.)	Center to Center of Engine Bearers (In.)	Price Complete at Factory										
	Department of Commerce License or A. T. C. No.	Arrangement	Cooling Medium	Number of Cylinders	Bore and Stroke (In.)	Total Piston Displace- ment (Cu. In.)	Compression Ratio	B.M.E.P. at Cruising (Lb. per Sq. In.)	Blower Ratio	Cylinder Material	No. of Valves per Cylin- der		Maximum (Except Take-off)		Take-off		Cruising			Octane Rating of Fuel Required	Propeller Drive		Engine—Dry Without Hnd or Starter					Per Cruising Hp.	Fitted	Number and Make	Current Source	Number	Make	Method	Length	Height	Width
											Intake	Exhaust	R.P.M.	At Sea Level or Altitude (Ft.)	Horsepower	R.P.M.	Horsepower	R.P.M.					Horsepower														
Aeronca (1)	71	Hor	Air	2-4 1/4 x 4	113.0	5.40	115	No	5	1	1	40	2540	SL	37	2250	73	D	D	73	117	3.16	1-Str	Bos	Mag	1	PS	24 1/2	22 1/2	34 1/2	15 5/8	\$350					
Aeronca	E-113CB	189	Hor	Air	2-4 1/4 x 4	113.0	5.40	117	No	5	1	42	2500	SL	37.5	2250	73	D	D	73	118	3.14	1-Str	Bos	Mag	1	PS	24 1/2	22 1/2	34 1/2	15 5/8	675					
Aeronca	E-113CD	189	Hor	Air	2-4 1/4 x 4	113.0	5.40	117	No	5	1	42	2500	SL	37.5	2250	73	D	D	73	125	3.34	1-Str	Bos	Mag	2	PS	24 1/2	22 1/2	34 1/2	15 5/8	750					
Aeronca	E-113CBD	189	Hor	Air	2-4 1/4 x 4	113.0	5.40	126	No	5	1	45	2500	SL	49.5	2250	73	D	D	73	125	3.08	1-Str	Bos	Mag	2	PS	24 1/2	22 1/2	34 1/2	15 5/8	775					
Continental	A-50	190	Hor	Air	4-3 3/8 x 3 3/8	171.0	5.40	122 1/2	No	5	1	65	1900	SL	50	1900	65	D	D	65	155	3.10	1-Str	Scin	Mag	1-2	PS	30 1/2	22 1/2	31 1/2	11 1/8	P.O.A.					
Continental	A-55		Hor	Air	4-3 3/8 x 3 3/8	171.0	6.30	128 1/2	No	5	1	65	2350	SL	65	2350	73	D	D	73	155	2.38 1/2	1-Str	Scin	Mag	1-2	PS	30 1/2	22 1/2	31 1/2	11 1/8	P.O.A.					
Franklin (2)	4AC-150	194	Hor	Air	4-3 3/8 x 3 3/8	150.0	6.60	96	No	6	1	50	2300	SL			38	2100	70	D	155(d)	4.03(d)	1-Str	Scin	Mag	1-2	PS	27 1/2	18 3/8	34 1/8	10	441(c)					
Guiberson Aero Diesel	A-918		Rad	Air	9-4 1/8 x 5 1/2	918.0	16.00	91	No	5	(a)	273	2050	SL	253	2100	200	1900	Di	Di	549	2.74				EC	EM	35 1/2	49 1/2			P.O.A.					
Guiberson Aero Diesel	A-1020		Rad	Air	9-5 1/8 x 5 1/2	1021.0	15.00	87	No	5	1	340	2250	SL	340	2250	220	1950	Di	Di	640	2.90				EC	EM	36 1/2	47			P.O.A.					
Guiberson Aero Diesel	T-1020		Rad	Air	9-5 1/8 x 5 1/2	1021.0	15.00	91 1/2	No	5	1	285	2250	SL					Di	Di	616	2.32 1/2				EC	EM	23 1/2	45			P.O.A.					
Jacobs	L-4	121	Rad	Air	7-5 1/8 x 5	757.0	5.38	96	No	5	1	225	2000	SL	175	1900	73	D	D	73	495	2.77	1-Str	Scin	Mag	2	EC	35 1/2	43 1/2		13 1/2	P.O.A.					
Jacobs	L-4MB	121	Rad	Air	7-5 1/8 x 5	757.0	5.38	96	No	5	1	225	2000	SL	175	1900	73	D	D	73	490	2.80	1-Str	Scin	Mag	2	EC	35 1/2	43 1/2		13 1/2	P.O.A.					
Jacobs	L-4MA7	121	Rad	Air	7-5 1/8 x 5	757.0	5.38	96	No	5	1	225	2000	SL	175	1900	73	D	D	73	494	2.82	1-Str	Scin	Mag	2	EC	35 1/2	43 1/2		13 1/2	P.O.A.					
Jacobs	L-5	156	Rad	Air	7-5 1/8 x 5	831.0	6.00	105	No	5	1	235	2000	SL	210	1900	73	D	D	73	510	2.43	1-Str	Scin	Mag	2	EC	35 1/2	43 1/2		13 1/2	P.O.A.					
Jacobs	L-5B	156	Rad	Air	7-5 1/8 x 5	831.0	6.00	105	No	5	1	235	2000	SL	210	1900	73	D	D	73	521	2.43	1-Str	Scin	Mag	2	EC	35 1/2	43 1/2		13 1/2	P.O.A.					
Jacobs	L-5MB	156	Rad	Air	7-5 1/8 x 5	831.0	6.00	105	No	5	1	235	2000	SL	210	1900	73	D	D	73	521	2.43	1-Str	Scin	Mag	2	EC	35 1/2	43 1/2		13 1/2	P.O.A.					
Jacobs	L-5MA	156	Rad	Air	7-5 1/8 x 5	831.0	6.00	105	No	5	1	235	2000	SL	210	1900	73	D	D	73	521	2.43	1-Str	Scin	Mag	2	EC	35 1/2	43 1/2		13 1/2	P.O.A.					
Jacobs	L-5	195	Rad	Air	7-5 1/8 x 5 1/2	914.0	6.00	100	No	5	1	300	2100	3700	330	2200	220	1900	80-90		2.50	1-Str	Scin	Mag	2	EC	33 1/2	43 1/2		13 1/2	P.O.A.						
Jacobs	L-5M	195	Rad	Air	7-5 1/8 x 5 1/2	914.0	6.00	100	No	5	1	300	2100	3700	330	2200	220	1900	80-90		2.50	1-Str	Scin	Mag	2	EC	33 1/2	43 1/2		13 1/2	P.O.A.						
Jacobs	L-5MB	195	Rad	Air	7-5 1/8 x 5 1/2	914.0	6.00	100	No	5	1	300	2100	3700	330	2200	220	1900	80-90		2.50	1-Str	Scin	Mag	2	EC	33 1/2	43 1/2		13 1/2	P.O.A.						
Jacobs	L-5MA	195	Rad	Air	7-5 1/8 x 5 1/2	914.0	6.00	100	No	5	1	300	2100	3700	330	2200	220	1900	80-90		2.50	1-Str	Scin	Mag	2	EC	33 1/2	43 1/2		13 1/2	P.O.A.						
Jacobs	L-6MA	195	Rad	Air	7-5 1/8 x 5 1/2	914.0	6.00	100	No	5	1	300	2100	3700	330	2200	220	1900	80-90		2.50	1-Str	Scin	Mag	2	EC	33 1/2	43 1/2		13 1/2	P.O.A.						
Kinner	K-5	3	Rad	Air	5-4 1/8 x 5 1/2	372.0	5.00	118 1/2	No	5	1	100	1810	SL					73	D	275	2.75	1-Str	BS	Mag	2	Air	32 1/2	45 1/2			P.O.A.					
Kinner	B-5	51	Rad	Air	5-4 1/8 x 5 1/2	441.0	5.25	127 1/2	No	5	1	125	1925	SL					73	D	235	2.36 1/2	1-Str	Scin	Mag	2	A-DE	32 1/2	45 1/2			P.O.A.					
Kinner	R-5	153	Rad	Air	5-5 1/8 x 5 1/2	540.0	5.50	127 1/2	No	5	1	150	1850	SL					73	D	330	2.06 1/2	1-Str	Scin	Mag	2	A-DE	32 1/2	45 1/2			P.O.A.					
Kinner	C-5	62	Rad	Air	5-5 1/8 x 5 1/2	715.0	5.20	122 1/2	No	5	1	210	1900	SL					73	D	423	2.03	1-Str	Scin	Mag	2	EC	44 1/2	51 1/2			P.O.A.					
Kinner	SC-7	175	Rad	Air	7-5 1/8 x 6	1044.0	5.25	128 1/2	No	5	1	300	1800	SL					73	D	600	2.03	1-Str	Scin	Mag	2	EC	44 1/2	51 1/2			P.O.A.					
Kinner	SC-7	175	Rad	Air	7-5 1/8 x 6	1044.0	5.50	140 1/2	9.70	5	1	350	1900	5000	350	1900			73	D	650	1.86 1/2	1-Str	Scin	Mag	2	EC	45 1/2	47 1/2			P.O.A.					
Lycoming (4)	O-145-A1	199	Hor	Air	4-3 3/8 x 3 1/2	144.5	5.65	99	No	7	1	50	2300	SL					73	D	160	3.95	1-Str	Scin	Mag	1	EC	23 1/2	19 1/2	21 1/2	13 1/2	P.O.A.					
Lycoming	O-145-A2	199	Hor	Air	4-3 3/8 x 3 1/2	144.5	5.65	110	No	7	1	55	2300	SL					73	D	160	3.95	1-Str	Scin	Mag	1	EC	23 1/2	19 1/2	21 1/2	13 1/2	P.O.A.					
Lycoming	O-145-A3	199	Hor	Air	4-3 3/8 x 3 1/2	144.5	5.65	110	No	7	1	55	2300	SL					73	D	165	3.93	1-Str	Scin	Mag	1	EC	23 1/2	19 1/2	21 1/2	13 1/2	P.O.A.					
Lycoming	R-530-D1	182	Rad	Air	7-4 1/8 x 4 1/2	529.2	5.50	131	No	5	1	200	2100	SL	220	2300	175	2000	80		185	3.93	1-Str	Scin(b)	Mag	1	EC	34 1/2	43 1/2		13 1/2	P.O.A.					
Lycoming	R-530-D2	182	Rad	Air	7-4 1/8 x 4 1/2	529.2	5.50	131	No	5	1	200	2100	SL	220	2300	175	2000	80		185	3.93	1-Str	Scin(b)	Mag	1	EC	34 1/2	43 1/2		13 1/2	P.O.A.					
Lycoming	R-530-BAC	108	Rad	Air	9-4 1/8 x 4 1/2	680.4	5.50	101	No	5	1	190	2100	SL	210	2300	165	1900	73		430	2.46	1-Str	Scin(b)	Mag	1	EC	34 1/2	43 1/2		13 1/2	P.O.A.					
Lycoming	R-530-BDC	108	Rad	Air	9-4 1/8 x 4 1/2	680.4	5.50	101	No	5	1	225	2100	SL	220	2300	165	1900	73		432	2.46	1-Str	Scin(b)	Mag	1	EC	34 1/2	43 1/2		13 1/2	P.O.A.					
Lycoming	R-530-BE	172	Rad	Air	9-4 1/8 x 4 1/2	680.4	5.50	122	No	5	1	225	2100	SL	220	2300	210	2100	80		516	2.46	1-Str	Scin(b)	Mag	1	EC	37 1/2	43 1/2		13 1/2	P.O.A.					
Lycoming	R-530-DE	202	Rad	Air	9-4 1/8 x 4 1/2	680.4	5.50	116	No	5	1	225	2100	SL	220	2300	210	2100	80		516	2.46	1-Str	Scin(b)	Mag	1	EC	37 1/2	43 1/2		13 1/2	P.O.A.					
Lycoming	R-530-E1	202	Rad	Air	9-4 1/8 x 4 1/2	680.4	5.50	128	No	5	1	225	2100	SL	220	2300	210	2100	80		516	2.46	1-Str	Scin(b)	Mag	1	EC	37 1/2	43 1/2		13 1/2	P.O.A.					
Lycoming	R-530-E2	202	Rad	Air	9-4 1/8 x 4 1/2	680.4	5.50	122	No	5	1	225	2100	SL	220	2300	210	2100	80		516	2.46	1-Str	Scin(b)	Mag	1	EC	37 1/2	43 1/2		13 1/2	P.O.A.					
Lycoming	R-530-E3	202	Rad	Air	9-4 1/8 x 4 1/2	680.4	5.50	131																													

[illegible]

U. S. Production and Sales of Tractors*

KIND	MANUFACTURED			Total		For Domestic Use		For Export	
	Number	Value	Number	Value	Number	Value	Number	Value	
Wheel Type	1938 1937	\$116,583,025 159,685,605	173,321 243,578	\$116,843,956 161,098,035	141,593 216,169	\$ 92,875,574 140,934,175	31,728 27,409	\$ 23,968,382 20,163,860	
Tracklaying Type	1938 1937	33,771,694 66,416,335	19,801 30,780	40,221,557 59,964,621	11,251 21,449	24,062,928 42,776,124	8,550 9,331	16,138,631 17,166,497	
Total Tractors	1938 1937	\$150,354,719 227,679,355	193,122 284,376	\$157,065,513 222,602,559	152,844 247,370	\$116,958,500 189,178,518	40,278 37,206	\$ 40,107,013 37,424,041	

Department of Commerce, Bureau of Census.

AUTOMOTIVE DIESEL AND OTHER HEAVY OIL ENGINES

ENGINE MAKE AND MODEL	Designed For	Type	Number of Cylinders—Bore and Stroke	Piston Displacement (Cu. In.)	Maximum Intermediate H.p. at Specified R.P.M.	Hp. at Specified R.P.M.	Compression Ratio — to 1.	Cycle	Compression Pressure at Specified R.P.M.	Maximum Pressure (Lbs. per Sq. In.)	B.M.E.P. at Continuous (Lbs. per Sq. In.)	Weight per Continuous H.p. (Lb.)	Maximum Torque in Lb. Ft. at Specified R.P.M.	Weight Equipped (Lb.)	VALVES				PISTONS			CONNECTING RODS			INJECTION VALVE								
															Arrangement		Intake Port Diameter and Lift (In.)	Exhaust Port Diameter and Lift (In.)	Timing (Degrees)		Material	Length	No. of Rings per Piston	Weight with Pins and Pin (Lb.)	Material	Center to Center Length (In.)	Weight with Cap and Bushing	Value Type, Open or Closed	Type Orifices—Single, Multiple or Pinle	Injection Pressure (Lbs. per Sq. In.)	Fuel Consumption at Rated Load (Lb. per B. Hp. Hr.)	Starting Method	
															Intake Opens	Intake Closes			Exhaust Open	Exhaust Closes													
Allis-Chalmers L.O. Tr		DI	6 5 1/2 x 6 1/2	844	97 1050	86 1050	6.5	4	150 500	450	77	38.0	560 750	3275 VI	VI	225-490	5A	40AB	44BB	9A	44BB	TCI	8.18	4	11.10	1045	13.00	11.00	C	Mul	1300	48	H.E.
Allis-Chalmers S.O. Tr		DI	4 5 1/2 x 6 1/2	675	77 1050	68 1050	6.5	4	155 550	450	76	37.4	440 750	2550 VI	VI	225-490	TC	40AB	44BB	9A	44BB	TCI	8.10	4	12.00	1045	13.00	12.00	C	Mul	1300	50	H.E.
Allis-Chalmers S.O. Tr		DI	4 5 1/2 x 6 1/2	563	63 1050	56 1050	6.5	4	155 550	450	75	38.9	370 750	2180 VI	VI	225-500	5A	40AB	44BB	9A	44BB	TCI	8.14	4	11.10	1045	13.00	11.00	C	Mul	1300	49	H.E.
Atlas Imperial 2AM115 M		DI	2 4 3/4 x 6 1/2	230	18 950	18 950	15.0	4	520 950	675	65	105.6	1900 VI	1900 VI	VI	1.62-390	5B	35AB	40BB	TC	40BB	TC	8.25	6	11.50	1040	13.00	10.80	C	Mul	3000	42	Ele
Atlas Imperial 4AM115 M		DI	4 4 3/4 x 6 1/2	460	40 950	40 950	15.0	4	520 950	675	72	57.5	2300 VI	2300 VI	VI	1.62-390	5B	35AB	40BB	TC	40BB	TC	8.25	6	11.50	1040	13.00	10.80	C	Mul	3000	42	Ele
Buda 4DTM-196 M		AC	4 3 1/2 x 4 1/2	195	50 2400	37 1800	14.5	4	390 600	725	83	25.0	143 1400	925 VI	VI	1.37-486	20B	38AB	45BB	13A	45BB	AL	4.93	5	3.00	1035	9.50	3.41	C	Pin	2000	49	Ele
Buda 4DTM-196 M		AC	4 3 1/2 x 4 1/2	195	50 2400	37 1800	14.5	4	390 600	725	95	23.4	125 1400	885 VI	VI	1.37-486	20B	38AB	45BB	13A	45BB	AL	4.93	5	3.00	1035	9.50	3.41	C	Pin	2000	47	Ele
Buda 4DTM-212 M		AC	4 3 1/2 x 5 1/2	212	52 2300	40 1800	14.5	4	390 600	725	83	25.0	152 1400	955 VI	VI	1.37-486	20B	38AB	45BB	13A	45BB	AL	4.93	5	3.00	1035	9.50	3.41	C	Pin	2000	49	Ele
Buda 4DTM-212 M		AC	4 3 1/2 x 5 1/2	212	52 2300	40 1800	14.5	4	390 600	725	83	25.0	152 1400	1000 VI	VI	1.37-486	20B	38AB	45BB	13A	45BB	AL	4.93	5	3.00	1035	9.50	3.41	C	Pin	2000	47	Ele
Buda 4DL-161 M		AC	4 6 1/2 x 8 1/2	1161	141 1100	118 1000	12.0	4	370 600	625	80	81.5	600	1815 VI	VI	2.37-686	20B	35AB	40BB	15A	40BB	AL	4.93	5	2.85	1035	17.75	27.00	C	Pin	1600	46	Ele
Buda 4DL-161 M		AC	4 6 1/2 x 8 1/2	1161	141 1100	118 1000	12.0	4	370 600	625	80	81.5	600	1815 VI	VI	2.37-686	20B	35AB	40BB	15A	40BB	AL	4.93	5	2.85	1035	17.75	27.00	C	Pin	1600	46	Ele
Buda 6LDM-275 M		AC	6 3 1/2 x 4 1/2	274	70 2600	58 1800	13.5	4	370 600	625	93	21.6	174 1200	1250 VI	VI	1.37-486	20B	38AB	45BB	13A	45BB	AL	4.93	5	3.00	1035	9.50	3.41	C	Pin	2000	48	Ele
Buda 6LDM-275 M		AC	6 3 1/2 x 4 1/2	274	70 2600	58 1800	13.5	4	370 600	625	93	21.6	174 1200	1250 VI	VI	1.37-486	20B	38AB	45BB	13A	45BB	AL	4.93	5	3.00	1035	9.50	3.41	C	Pin	2000	48	Ele
Buda 6DT-278 C		AC	6 3 1/2 x 4 1/2	278	72 2600	54 1800	14.5	4	390 600	725	79	25.0	195 1400	1250 VI	VI	1.37-486	20B	38AB	45BB	13A	45BB	AL	4.93	5	3.00	1035	9.50	3.41	C	Pin	2000	47	Ele
Buda 6DT-278 C		AC	6 3 1/2 x 4 1/2	278	72 2600	54 1800	14.5	4	390 600	725	81	23.1	210 1400	1250 VI	VI	1.37-486	20B	38AB	45BB	13A	45BB	AL	4.93	5	3.00	1035	9.50	3.41	C	Pin	2000	47	Ele
Buda 6DT-294 C		AC	6 3 1/2 x 4 1/2	294	75 2400	54 1800	14.5	4	390 600	725	81	23.1	210 1400	1250 VI	VI	1.37-486	20B	38AB	45BB	13A	45BB	AL	4.93	5	3.00	1035	9.50	3.41	C	Pin	2000	47	Ele
Buda 6DT-317 C		AC	6 3 1/2 x 5 1/2	317	81 2300	68 1800	14.5	4	390 600	725	94	16.7	210 1400	1133 VI	VI	1.37-486	20B	38AB	45BB	13A	45BB	AL	4.93	5	3.00	1035	9.50	3.41	C	Pin	2000	47	Ele
Buda 6DT-317 C		AC	6 3 1/2 x 5 1/2	317	81 2300	68 1800	14.5	4	390 600	725	94	16.7	210 1400	1133 VI	VI	1.37-486	20B	38AB	45BB	13A	45BB	AL	4.93	5	3.00	1035	9.50	3.41	C	Pin	2000	47	Ele
Buda 6DTM-317 M		AC	6 3 1/2 x 5 1/2	317	81 2300	68 1800	14.5	4	390 600	725	94	21.0	1400	1133 VI	VI	1.37-486	20B	38AB	45BB	13A	45BB	AL	4.93	5	3.00	1035	9.50	3.41	C	Pin	2000	47	Ele
Buda 6DTM-317 M		AC	6 3 1/2 x 5 1/2	317	81 2300	68 1800	14.5	4	390 600	725	94	21.0	1400	1133 VI	VI	1.37-486	20B	38AB	45BB	13A	45BB	AL	4.93	5	3.00	1035	9.50	3.41	C	Pin	2000	47	Ele
Buda 6DT-415 T		AC	6 4 5/2 x 5 1/2	415	87 2000	67 1600	14.2	4	390 600	725	80	21.1	304 1200	1415 VI	VI	1.46-476	12B	36AB	35BB	6A	35BB	AL	5.25	5	5	6140	11.00	4.87	C	Pin	2000	47	Ele
Buda 6DTM-415 M		AC	6 4 5/2 x 5 1/2	415	87 2000	67 1600	14.2	4	390 600	725	80	25.2	292 1200	1755 VI	VI	1.46-476	12B	36AB	35BB	6A	35BB	AL	5.25	5	5	6140	11.00	4.87	C	Pin	2000	47	Ele
Buda 6DTM-415 M		AC	6 4 5/2 x 5 1/2	415	87 2000	67 1600	14.2	4	390 600	725	80	25.2	292 1200	1755 VI	VI	1.46-476	12B	36AB	35BB	6A	35BB	AL	5.25	5	5	6140	11.00	4.87	C	Pin	2000	47	Ele
Buda 6DTM-468 M		AC	6 4 1/2 x 5 1/2	468	96 2000	75 1600	14.5	4	390 600	725	79	19.1	344	1435 VI	VI	1.59-476	12B	36AB	35BB	6A	35BB	AL	5.25	5	5	6140	11.00	4.87	C	Pin	2000	47	Ele
Buda 6DTM-468 M		AC	6 4 1/2 x 5 1/2	468	96 2000	75 1600	14.5	4	390 600	725	79	19.1	344	1435 VI	VI	1.59-476	12B	36AB	35BB	6A	35BB	AL	5.25	5	5	6140	11.00	4.87	C	Pin	2000	47	Ele
Buda 6DL-691 T		AC	6 4 3/2 x 6 1/2	691	123 1700	85 1200	12.5	4	370 600	625	81	26.5	504 1100	2270 VI	VI	1.75-516	15B	35AB	40BB	10A	40BB	AL	6.00	5	5.43	6140	12.50	10.25	C	Pin	2000	47	Ele
Buda 6DL-691 T		AC	6 4 3/2 x 6 1/2	691	123 1700	85 1200	12.5	4	370 600	625	81	26.5	504 1100	2270 VI	VI	1.75-516	15B	35AB	40BB	10A	40BB	AL	6.00	5	5.43	6140	12.50	10.25	C	Pin	2000	47	Ele
Buda 6LDM-912 M		AC	6 4 3/2 x 6 1/2	912	137 1700	124 1500	12.0	4	370 600	625	85	21.8	450 1100	2700 VI	VI	1.75-516	15B	35AB	40BB	10A	40BB	AL	6.00	5	5.43	6140	12.50	10.25	C	Pin	2000	47	Ele
Buda 6LDM-912 M		AC	6 4 3/2 x 6 1/2	912	137 1700	124 1500	12.0	4	370 600	625	85	21.8	450 1100	2700 VI	VI	1.75-516	15B	35AB	40BB	10A	40BB	AL	6.00	5	5.43	6140	12.50	10.25	C	Pin	2000	47	Ele
Buda 6DT-909 T		AC	6 5 1/2 x 7	909	155-1500	117 1200	13.7	4	390 600	725	85	25.5	650 900	3019 VI	VI	1.90-540	17B	33AB	39BB	11A	40BB	AL	8.00	8	8.00	6140	14.25	13.10	C	Pin	1600	47	Ele
Buda 6DT-909 T		AC	6 5 1/2 x 7	909	155-1500	117 1200	13.7	4	390 600	725	85	25.5	650 900	3019 VI	VI	1.90-540	17B	33AB	39BB	11A	40BB	AL	8.00	8	8.00	6140	14.25	13.10	C	Pin	1600	47	Ele
Buda 6LD-1611 R		AC	6 4 1/2 x 8 1/2	1611	196 1100	163 1000	12.0	4	370 600	625	80	42.1	1130 600	6875 VI	VI	2.37-687	20B	35AB	40BB	15A	40BB	AL	8.31	5	17.50	1035	17.25	27.00	C	Pin	1600	42	Ele
Buda 6LD-1611 R		AC	6 4 1/2 x 8 1/2	1611	196 1100	163 1000	12.0	4	370 600	625	80	42.1	1130 600	6875 VI	VI	2.37-687	20B	35AB	40BB	15A	40BB	AL	8.31	5	17.50	1035	17.25	27.00	C	Pin	1600	42	Ele
Buda 6DM-1742 M		AC	6 6 1/2 x 8 1/2	1742	21																												

General Motors General Motors	3-71 1-71	DI DI	3-41x5 1-41x5	213 199	83-2000 25-1600	45-1200 15-1200	16.0 16.0	2 500-1000	500-1000	980 70	26-27 58.41	263-1000 87-1000	11861 8751	VI VI	(b) (b)	156-375(a) 156-375(a)		PI PI	6.00 6.00	6 6	7.00CNS 7.00CNS	10.12 10.12	6.80 6.80	Mul Mul	(c) (c)	45 45	Ere Ere				
Hercules	DOOC	T	4-33x42	199	62-2600	48-1800	16.0	4	490-1000	760 106	17.7	142-1500	850 VI	VI	1.62-375	128	44AB	12A	AL	4.84	6	3.55CNSM	8.00	4.90C	Pin	1650	45	HE			
Hercules	DOOC	T	4-4x41	226	70-2600	55-1800	16.0	4	500-1000	760 109	16.2	161-1500	880 VI	VI	1.62-375	128	44AB	12A	AL	4.84	6	3.85CNSM	8.00	4.90C	Pin	1650	45	HE			
Hercules	DOOD	T	4-41x41	255	56-1600	60-1800	15.0	4	500-1000	760 109	16.6	181-1500	930 VI	VI	1.62-375	128	44AB	12A	AL	4.84	6	4.10CNSM	8.00	4.90C	Pin	1650	44	HE			
Hercules	DXJB	T	6-31x41	267	76-2600	60-1800	16.0	4	475-1000	750 102	16.3	178-1500	980 VI	VI	1.62-375	128	44AB	12A	AL	4.84	6	3.25CNSM	8.00	4.90C	Pin	1650	45	HE			
Hercules	DXJC	T	6-31x41	298	83-2600	69-1800	15.0	4	475-1000	750 102	14.8	200-1500	1020 VI	VI	1.62-375	128	44AB	12A	AL	4.84	6	3.55CNSM	8.00	4.90C	Pin	1650	42	HE			
Hercules	DXJB	T	6-43x45	474	120-2000	104-1600	15.0	4	475-1000	750 109	17.1	350-1500	1780 VI	VI	2.00-395	128	44AB	12A	AL	6.84	6	7.10CNSM	9.37	9.20C	Pin	1650	42	EG			
Hercules	DXJC	T	6-43x45	529	103-1600	103-1400	15.0	4	475-1000	750 113	17.7	388-1300	1820 VI	VI	2.00-395	128	44AB	12A	AL	7.53	6	9.53CNSM	9.37	9.20C	Pin	1650	42	EG			
Hercules	DXJB	T	6-5x6	707	160-1600	142-1400	15.0	4	475-1000	750 113	17.7	530-1400	2520 VI	VI	2.37-500	58	50AB	45BB	10A	AL	7.53	6	9.53CNSM	12.00	11.70C	Pin	1650	41	EG		
Hercules	DHXC	T	6-51x46	855	127-1000	127-1000	15.0	4	475-1000	750 118	20.0	675-875	2550 VI	VI	2.37-500	58	50AB	45BB	10A	AL	7.53	6	10.00CNSM	12.00	11.70C	Pin	1650	40	EG		
Hill (4)	CM	Stia	6-31x46	346	117-1800	117-1800	15.0	4	550	850 89	22.2	675-875	2550 VI	VI	2.37-500	58	50AB	45BB	10A	AL	7.53	6	10.00CNSM	12.00	11.70C	Pin	1650	40	EG		
Hill (2)	BM	Stia	6-31x46	824	95-1000	95-1000	15.0	4	550	850 91	42.1	675-875	2550 VI	VI	2.37-500	58	50AB	45BB	10A	AL	7.53	6	10.00CNSM	12.00	11.70C	Pin	1650	40	EG		
Hill (4)	AM	Stia	6-6x10	1696	120-800	120-800	15.0	4	550	850 70	75.0	675-875	2550 VI	VI	2.37-500	58	50AB	45BB	10A	AL	7.53	6	10.00CNSM	12.00	11.70C	Pin	1650	40	EG		
International	PD-35	Tr	4-41x41	414	46-1100	46-1100	17.0	4	615-1100	661	17.0	615-1100	1880 VI	VI	2.03-502	108	25AB	43BB	10A	AL	6.15	5	7.50	1040	13.25	11.56C	Sin	2500	(x)		
International	PD-40	Tr	4-43x43	461	63-1250	50-1250	17.0	4	625-1250	661	38.0	606-600	1900 VI	VI	2.03-502	108	25AB	43BB	10A	AL	6.18	5	8.58	1040	13.25	11.56C	Sin	2500	(x)		
International	PD-50	Tr, M, Pu	6-43x43	691	100-1400	80-1400	17.0	4	625-1400	661	32.5	418-750	2600 VI	VI	2.03-502	108	25AB	43BB	10A	AL	6.18	5	8.58	1040	13.25	11.56C	Sin	1500	(x)		
Kermath	DOOC	M	4-4x41	226	70-2600	55-1800	14.5	4	475-1000	750 107	21.8	155-1500	1200 VI	VI	1.62-375	12A	44AB	48BB	12A	AL	4.84	6	3.55CNSM	8.00	4.90C	Pin	2100	45	Ele		
Kermath	DOOC	M	6-33x42	298	84-2600	69-1800	14.5	4	475-1000	750 102	17.7	178-1350	1200 VI	VI	1.62-375	128	44AB	48BB	12A	AL	4.84	6	3.55CNSM	8.00	4.90C	Pin	2100	44	Ele		
Kermath	DRXM	M	6-43x43	474	120-2000	104-1600	14.5	4	475-1000	750 109	19.2	350-1300	2000 VI	VI	2.00-395	128	44AB	48BB	12A	AL	6.84	6	7.10CNSM	9.37	9.20C	Pin	1650	40	Ele		
Kermath	DRXM	M	6-5x6	707	160-1600	142-1400	14.5	4	475-1000	750 113	21.8	535-1400	3100 VI	VI	2.37-500	58	50AB	45BB	10A	AL	7.53	6	9.53CNSM	12.00	11.70C	Pin	1650	40	Ele		
Mack-Lanova	ED	T, B	6-49x53	519	131-2000	131-2200	14.5	4	465-1000	...	91	382-1200	1823 VI	VI	1.64-500	208	35AB	42BB	13A	AL	5.75	5	4.61	4130	11.25	6.40	Pin	1700	47	Ele	
Red Wing-Hesselman	35-40HP	M	4-33x43	210	40-2000	35-1500	6.25	4	130-1000	450 88	24.3	122-1200	880 VI	VI	1.62-375	58	40AB	40BB	15A	CI	4.56	4	3.80	1045	8.75	2.87C	Mul	1200	56	Ele	
Red Wing-Hesselman	55-60HP	M	4-41x45	353	60-1500	53-1500	6.20	4	130-1000	450 88	21.6	230-1000	1200 VI	VI	1.75-450	10A	40AB	40BB	10A	CI	5.96	4	6.00	1045	10.50	5.30C	Mul	1200	58	Ele	
Red Wing-Hesselman	80-90HP	M	4-6x61	735	95-1200	88-1050	5.60	4	125-1000	550 90	26.2	453-700	2300 VI	VI	2.37-580	10A	40AB	40BB	10A	CI	8.18	4	15.80	1045	13.25	9.30C	Mul	1200	56	Ele	
Red Wing-Hesselman	65-75HP	M	6-31x41	282	75-2500	560-1600	6.40	4	135-1000	450 87	17.2	120-1000	950 VI	VI	1.62-375	58	47AB	45BB	10A	AL	4.97	4	2.56	1045	8.00	2.56C	Mul	1200	56	Ele	
Red Wing-Hesselman	160-200HP	M	6-61x47	1395	172-1125	165-1050	5.60	4	125-1000	550 88	34.0	900-540	5600 VI	VI	2.50-710	5A	40AB	40BB	5A	CI	9.25	4	20.50	1045	15.37	19.00C	Mul	1200	57	Ele	
Red Wing-Hesselman	180-200HP	M	6-7x7	1616	196-1125	188-1050	5.50	4	125-1000	550 88	30.3	1030-540	5800 VI	VI	2.50-710	5B	40AB	40BB	5A	CI	9.25	4	24.75	1045	15.37	19.00C	Mul	1500	53	Ele	
Red Wing-Hesselman	75-100HP	M	6-5x51	462	100-2200	77-1500	17.0	4	550-1000	750 98	28.6	275-1100	2200 VI	VI	1.62-540	6B	45AB	45BB	6A	AL	6.25	5	5.62	3140	11.75	5.10C	Pin	1500	53	Ele	
Red Wing-Hesselman	120-140HP	M	6-5x51	648	136-2000	114-1500	17.0	4	550-1000	750 93	22.8	411-1100	2600 VI	VI	2.00-540	6B	45AB	45BB	6A	AL	6.50	5	7.80	3140	11.75	8.50C	Pin	1500	51	Ele	
Regal	DF	M	6-33x43	298	84-2600	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Superior	MA-2	M	4-41x45	383	24-1600	24-1400	11.8	4	360-700	675 74	41.6	134-1200	1000 VI	VI	1.87-432	8B	39AB	39BB	8A	NI	6.68	6	9.40	4145	11.50	9.25C	Pin	1600	...	...
Superior	MA-4	M	4-41x45	366	62-1500	53-1500	11.8	4	360-700	675 76	31.2	267-1200	1650 VI	VI	1.87-432	8B	39AB	39BB	8A	NI	6.68	6	9.40	4145	11.50	9.25C	Pin	1600	...	...
Superior	MA-6	M	4-41x45	549	100-1600	85-1600	11.8	4	360-700	675 77	27.0	400-1200	2300 VI	VI	1.87-432	8B	39AB	39BB	8A	NI	6.68	6	9.40	4145	11.50	9.25C	Pin	1600	...	...
Superior	MA-8	M	4-41x45	732	150-1800	126-1800	11.8	4	360-700	675 76	25.4	533-1200	3200 VI	VI	1.87-432	8B	39AB	39BB	8A	AL	6.68	5	5.25	4145	11.50	9.25C	Pin	1600	...	...
Superior	MD-6	M	6-51x47	998	170-1500	133-1400	11.8	4	360-700	750 75	30.1	727-1000	4250 VI	VI	2.25-675	8B	39AB	39BB	8A	AL	8.00	5	9.41	1040	14.25	18.13C	Pin	1600	42	Ele	
Superior	MD-8	M	6-51x47	1330	230-1500	176-1400	11.8	4	360-700	750 75	30.1	965-1000	5300 VI	VI	2.25-675	8B	39AB	39BB	8A	AL	8.00	5	9.41	1040	14.25	18.13C	Pin	1600	42	Ele	
Waukegan-Hesselman	XBKH	T, Tr	4-43x45	210	42-2000	35-1500	6.25	4	125-1000	450 88	20.7	122-1200	715 VI	VI	1.62-375	58	40AB	40BB	15A	CI	4.56	4	3.80	1020	8.75	2.87C	Mul	1200	56	HE	
Waukegan-Hesselman	VBZH	T, Tr	4-43x45	353	66-1600	55-1400	6.20	4	125-1000	450 88	15.4	230-1000	920 VI	VI	1.75-450	10A	40AB	40BB	10A	CI	5.96	4	6.00	1020	10.50	5.30C	Mul	1200	58	HE	
Waukegan-Hesselman	WBKH	M, I	4-46x61	511	71-1200	65-1020	5.70	4	125-1000	450 96	28.9	338-700	1875 VI	VI	2.00-580	10A	40AB	40BB	10A	CI	8.18	4	12.25	1045	13.25	9.30C	Mul	1200	56	Ele	
Waukegan-Hesselman	WBKH	M, I	4-46x61	735	95-1200	88-1050	5.60	4	125-1000	450 96	21.6	453-700	1900 VI	VI	2.37-580	10A	40AB	40BB	10A	CI	8.18	4	15.80	1045	13.25	9.30C	Mul	1200	56	Ele	
Waukegan-Hesselman	WBKH	M, I	6-31x48	1062	112-950	112-950	5.40	4	125-1000	450 92	28.6	662-600	3200 VI	VI	2.50-570	TC	45AB	45BB	10A	CI	9.28	4	23.50	1045	18.00	17.40C	Mul	1200	57	HE	
Waukegan-Hesselman	WBKH	M, I	6-31x48	282	83-2600	59-1800	6.40	4	135-1000	450 92	12.7	174-1400	750 VI	VI	1.62-375	5A	47AB	45BB	10A	AL	4.87	4	2.56	1045	8.00	2.56C	Mul	1200	55	HE	
Waukegan-Hesselman	SWAKH	T, M, I	6-61x46	1013	771-1800	156-1300	5.50	4	125-1000	450 94	68.5	700-3200	3200 VI	VI	2.37-658	200-658	TC	40AB	45BB	10A	CI	8.37	4	16.38	1045	13.25	12.00C	Mul	1200	56	EG
Waukegan-Hesselman	SWAKH	T, M, I	6-61x46	1399	702-1800	185-1300	5.50	4	125-1000	450 94	17.4	811-700	3200 VI	VI	2.37-658	200-658	TC	40AB	45BB	10A	CI	8.37	4	16.38	1045	13.25	12.00C	Mul	1200	56	EG
Waukegan-Hesselman	SEKH	R, I	6-61x47	1395	70-1125	165-1050	5.60	4	125-1000	450 88	26.4	900-550	4875 VI																		

ABBREVIATIONS

1—Exhaust only
 2—Less generator, starter, fan, water and exhaust manifold
 3—With all accessories needed for normal operation
 4—Data for marine engines
 5—Also built with 6 cylinders
 6—Also built with 1, 2, 3 and 4 cylinders
 7—Also built with 4 and 6 cylinders
 8—Also built with 4 cylinders
 9—For starting only, gasoline and spark ignition
 10—Two exhaust valves per cylinder
 11—After top center
 12—Air (starting method)
 13—After bottom center
 14—Air chamber
 15—Air or electric
 16—Aluminum alloy

Als—Aluminum alloy—steel strut liner
 (b)—Two rows of $\frac{1}{16}$ diam. holes—64 total in cylinder
 B—Before top center
 B—Buses
 BB—Before bottom center
 C—1" to 20,000 lbs. per sq. in.
 C—Cars
 C—Closed (valv type)
 CI—Cast iron
 CMS—Chrome molybdenum steel
 CNM—Chrome nickel molybdenum
 DI—Direct injection
 E, G—Electric or gas engine
 Ele—Electric
 H—Hand
 H, E—Hand or electric

I—Industrial
 M—Marine
 Mul—Multiple
 NI—Nickel iron
 PC—Precombustion chamber
 PI—Pearlitic malleable iron
 Pin—Pinle
 Pu—Power unit
 R—Rail cars
 Sin—Single
 Sta—Stationary
 T—Trucks
 TC—Top center
 TC—Turbulence chamber
 TCI—Tin plated cast iron
 Tr—Tractors
 VI—Vertically in-head

EXPORTS

Leading Automotive Export Markets—1938

U. S. Factory Shipments only—does not include Canadian Exports

Passenger Cars and Chassis

Country of Destination	Value	Units
Union of South Africa	\$14,213,361	23,373
Argentina	10,108,823	18,727
Canada	8,673,633	12,057
Sweden	8,285,800	13,986
Belgium	6,833,082	11,175
Australia	6,706,427	16,423
Brazil	3,891,126	6,523
United Kingdom	3,289,530	4,243
Hawaii	2,868,340	3,964
Venezuela	2,204,298	3,088
Philippine Islands	2,088,005	2,815
Mexico	2,080,356	2,845
Cuba	2,071,449	2,702
Egypt	2,063,723	2,793
British India	1,809,823	2,861
Colombia	1,681,217	2,142
Norway	1,615,852	2,402
New Zealand	1,544,022	2,362
Netherlands	1,266,948	1,631
Puerto Rico	1,258,275	1,673
Total	\$84,554,090	137,785
Total All Countries	\$104,628,982	167,693

Trucks, Buses and Chassis

Country or Destination	Value	Unit
Argentina	\$3,855,674	7,792
Canada	3,711,148	2,527
Venezuela	3,708,316	4,622
France	3,503,596	3,419
Hong Kong	3,312,967	5,706
Union of South Africa	3,028,054	5,769
Belgium	2,660,777	6,120
Sweden	2,609,809	5,652
China	2,591,417	4,455
Australia	2,545,684	4,962
Brazil	2,541,508	4,580
British India	2,350,725	5,682
Japan	2,091,237	5,802
Spain	1,927,073	2,498
Colombia	1,912,395	2,451
Philippine Islands	1,782,481	2,274
Norway	1,674,486	2,867
Iran	1,485,485	894
Kwantung	1,399,490	2,188
Peru	1,391,601	1,895
Total	\$50,083,923	82,155
Total All Countries	\$74,451,986	117,943

Value of Leading U. S. Automotive Exports*

Passenger Cars	\$104,628,982
Passenger Cars, Used	842,083
Trucks, Buses and Chassis	74,451,986
Trucks and Buses, Used	73,993
Trailers	1,021,364
Engines, for Assembly:	
Truck and Bus	122,755.6
Passenger Car	3,160,057
Engines for Replacement	190,139
Parts for Assembly	46,473,076
Parts for Replacement	37,778,147
Truck and Bus Casings	5,513,154
Other Automobile Casings	7,732,680
Inner Tubes	1,688,678
Solid Tires	173,164
Tire Sundries and Repair Materials	770,895
Storage Batteries	1,698,083
Battery Chargers	237,694
Portable Electric Tools	1,382,303
Motorcycles	989,076
Motorcycle Parts and Accessories	308,902
Aeronautical Products	68,700,366
Total	\$360,569,948

CANADIAN

Cars	\$ 15,311,201
Trucks	6,924,273
Parts and Accessories	2,679,265
Tires and Tubes	7,904,552

Total	\$ 32,819,291
Grand Total Exports of American Manufacture	\$393,389,239

* Automotive-Aeronautics Division, Bureau of Foreign and Domestic Commerce.

American Passenger Car Exports—1938*

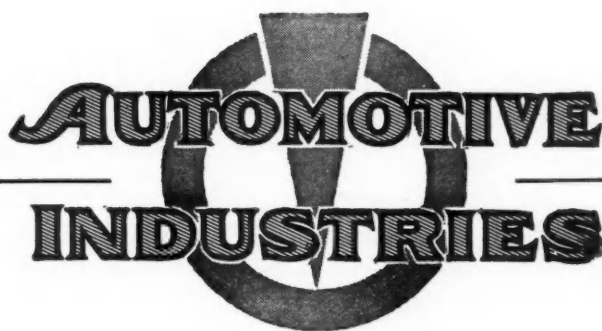
COUNTRIES	Not over \$850		Over \$850, not over \$1200		Over \$1200, not over \$2000		Over \$2000		Total 1938 Passenger Cars		Total 1937 Passenger Cars	
	No.	Dollars	No.	Dollars	No.	Dollars	No.	Dollars	No.	Dollars	No.	Dollars
Europe	39,388	\$22,210,082	5,516	\$5,343,944	757	\$1,170,344	252	\$614,930	45,913	\$29,339,300	58,222	\$35,988,255
North America	15,251	10,329,191	3,328	3,200,963	721	1,042,112	127	352,241	20,427	14,924,507	32,146	22,226,633
South America	30,384	16,670,344	3,291	3,185,965	387	561,101	104	223,708	34,166	20,641,118	42,035	23,972,824
Asia	11,878	6,985,288	1,636	1,584,569	233	344,539	52	145,113	13,799	9,059,509	24,857	14,942,902
Oceania	18,179	7,660,483	575	523,891	45	66,737	6	14,573	18,805	8,265,684	26,656	11,097,693
Africa	25,201	14,470,764	3,031	2,910,752	213	315,608	57	215,969	28,502	17,913,093	45,570	26,586,415
Total	141,281	\$78,326,152	17,377	\$16,750,084	2,356	\$3,500,441	598	\$1,566,534	161,612	\$100,143,211	229,486	\$134,814,725
Alaska									417	340,770	400	319,625
Hawaii	3,478	2,384,954	430	397,448	49	70,043	7	15,895	3,954	2,868,340	4,951	3,440,206
Puerto Rico	1,298	887,093	348	329,636	26	39,404	1	2,142	1,673	1,258,275	2,813	2,017,499
Virgin Islands	23	14,856	4	3,530					27	18,386	69	46,148
Grand Total	146,080	\$81,613,055	18,159	\$17,480,698	2,431	\$3,609,889	606	\$1,584,571	167,693	\$104,628,982	237,719	\$140,638,203

* Automotive Division, Bureau of Foreign and Domestic Commerce.

American Truck Exports—1938*

COUNTRIES	Under 1 Ton		1 Ton and not over 1½ Tons		Over 1½ Tons and not over 2½ Tons		Over 2½ Tons		Bus Chassis		Total 1938 Trucks, Buses and Chassis		Total 1937 Trucks and Buses	
	No.	Dollars	No.	Dollars	No.	Dollars	No.	Dollars	No.	Dollars	No.	Dollars	No.	Dollars
Europe	3,975	\$1,415,845	23,214	\$12,096,952	3,618	\$2,865,009	2,631	\$4,312,993	843	\$591,972	34,281	\$21,272,771	45,981	\$30,593,502
North America	1,457	790,033	4,214	2,688,483	1,171	1,143,504	1,075	2,846,177	67	116,780	7,984	7,584,977	15,865	12,919,353
South America	3,607	1,531,930	17,193	10,278,971	1,984	1,775,186	856	1,483,395	208	141,320	23,758	15,210,802	32,457	19,040,365
Asia	2,015	799,986	25,481	12,630,033	2,902	2,106,088	577	1,972,741	78	289,103	31,053	17,797,951	37,457	19,829,522
Oceania	2,000	810,821	3,025	1,585,569	857	700,177	126	207,292	11	15,508	6,019	3,319,367	9,349	4,718,291
Africa	4,098	1,796,316	6,871	3,604,988	1,031	826,087	470	675,639	30	28,032	12,500	6,931,062	24,601	13,004,439
TOTAL	17,152	\$7,144,931	79,908	\$42,874,996	11,563	\$9,416,051	5,735	\$11,498,237	1,237	\$1,182,715	115,595	\$72,116,930	165,710	\$100,105,472
Alaska											267	271,740	350	315,150
Hawaii	438	262,670	395	288,943	98	112,703	118	589,529	1	4,050	1,050	1,257,895	1,788	1,607,772
Puerto Rico	186	103,133	559	403,398	233	227,542	20	55,213			1,008	799,286	1,166	821,368
Virgin Islands	4	2,414	18	11,725	1	1,996					23	16,135	62	40,177
GRAND TOTAL	17,780	\$7,513,148	80,890	\$43,579,062	11,895	\$9,758,292	5,873	\$12,142,979	1,238	\$1,186,765	117,943	\$74,451,986	169,076	\$102,889,939

*Automotive Division, Bureau of Foreign and Domestic Commerce.



Production Upturn Expected in March

**Week's Output Estimated
at About 78,000 Units**

Month-end adjustment of production schedules and work stoppage resulting from the factional dispute within the United Automobile Workers Union combined to bring about a reduction in the output of cars and trucks during the week ending Feb. 25.

Car and truck production for the week is estimated as somewhere between 76,000 and 78,000 units, a drop of several thousand from the preceding week and probably the lowest total for any week in the month. February production to date has totaled approximately 285,000 cars and trucks which places the month well ahead of 1938 when 202,597 cars and trucks were turned out during the entire month. With two days still to go, representing half a week in most plants, the February total this year should be well over 300,000 units although probably lower than 330,000, originally projected.

An upturn in productive rate is confidently expected during March although the usual seasonal step-up in sales will have to be evident before that occurs as all manufacturers are continuing to base their production schedules on orders received from the dealer organization. The industry probably will begin March at a slightly lower level than that in effect at the beginning of February with succeeding weeks showing improvement.

(Turn to page 266, please)

Goodrich Reports 1938 Profit of \$2,240,119

Consolidated net profit of the B. F. Goodrich Co. for 1938 amounted to \$2,240,119 after all charges and provisions for federal income taxes, according to the preliminary statement.

After provision for the year's dividend requirements on the company's \$5 cumulative preferred stock, these earnings were equivalent to 14 cents a share on the company's 1,314,296 shares of common stock outstanding and compared with a consolidated net loss of \$878,580 in 1937. The company reported a net loss of \$209,551 for the six months ended June 30, 1938.

AUTOMOTIVE INDUSTRIES

*Summary of Automotive Production Activity
(Week Ending Feb. 25)*

BUSES Major upward revisions in production schedules do not appear to be the prospect for the immediate future. Vaguely encouraging are persistent rumors that some big orders are soon due to materialize.

TRUCKS While one large producer takes the view that "anything is likely to happen to change the picture," consensus seems to be that the outlook for 1939 is reasonably good. There are a few reports of slight increases in production.

TRACTORS No change. Typical manufacturer view is "there are so many factors which may influence farm prices that a forecast for 1939 is difficult."

AUTOMOBILES Production dropped several thousand from the preceding week to aggregate approximately 78,000 units. March is expected to bring an upturn in output rate.

MARINE ENGINES No new activity to brighten the outlook in this field.

AIRCRAFT ENGINES Orders show gains in spite of peak production by large and small companies. Several companies report slightly increased demand for experimental engineers to handle larger volume of development work.

This summary is based on confidential information of current actual production rates from leading producers in each field covered. Staff members in Detroit, Chicago, New York and Philadelphia collect the basic information, in all cases from official factory sources.

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Government Seeking \$1,053,474 "Damages" from 18 Tire Makers

**Department of Justice Files Suit Charging
Price Fixing Conspiracy in Identical Bids**

Instituting an ambitious campaign to break up a practice followed by numerous industries, the Department of Justice for some undisclosed reason singled out the automobile tire industry to file a triple damage suit charging that identical bids submitted to the Government create a presumption of a combination to fix prices. This suit is the first of the kind ever entered by the Federal Government. It is a civil action taken under Sec. 7 of the Sherman anti-trust law.

Filed on Feb. 20 in the United States District Court for the Southern District of New York, the Department said this type of suit was selected because criminal action would not compensate the Government inasmuch as the fine recoverable would be only \$5,000 because injunctive relief is inappropriate since

the tire manufacturers no longer submit identical bids.

The amount of damages the Government is seeking from the 18 tire manufacturers named in its complaint is \$1,053,474. This sum represents three times the difference between the prices paid by the Government during the purchasing period, April 1, 1938, to Sept. 30, 1938, after the so-called "conspiracy" had ceased and the higher prices during the three preceding six-month periods.

The fact that the suit was begun after tire manufacturers have ceased presenting like bids is one of the puzzling reasons why the tire industry was chosen for Government attack. The suggestion has been made that the Government feels it has a good case

(Turn to page 258, please)

Rumors of Big Orders for Sheets Bolsters Steel Market Sentiment

Competition Among Producers for Slice of New Automotive Business Will Be Unusually Sharp

Steel producers continue in an expectant mood regarding flat rolled steel tonnage orders from automobile manufacturers. Market gossip persists that several good-sized commitments for automobile sheets are in the offing. Competition for a slice of this business is certain to be keen. The sharp contrast between the high rate at which Detroit district mills have been operating lately and the moderate pace in other steel-producing areas bids fair to make the battle for orders from automobile manufacturers more spirited than usual.

Since the change in the basing point system, Detroit quotations have been on a delivered basis, \$2 a net ton higher than the f.o.b. quotations of Cleveland, Youngstown, Pittsburgh, and Chicago mills. This differential set-up has not affected the ability of Detroit producers to more than hold their own in their home market. Some fill-in business came out early this week at unchanged prices. While there is talk of producers planning to adjust prices of some products which, they contend, are underpriced, it is highly improbable that changes in the base prices of rolled flat steel products are contemplated.

Purchasing agents of automobile manufacturers apparently consider it good policy for the present to place orders more frequently rather than to anticipate requirements too far in advance. When it comes to cold rolled automobile sheets, however, they are compelled to make allowance for the time it takes for finishing operations, and sheets needed late in March and early in April have to be ordered now. Routine conditions prevail in the market for cold-finished carbon and alloy steel bars. Demand for bolts and nuts is fair. There is also some inquiry for manufacturing wire. Washington's Birthday is not considered a production holiday in the steel industry, but the mild recession in this week's employed ingot capacity, which the American Iron & Steel Institute reported at 53.7

(Turn to page 273, please)

Yellow Truck Will Pay \$1.75 Dividend April 3

Yellow Truck & Coach Co. has declared a quarterly dividend of \$1.75 per share on the 7 per cent cumulative preferred stock, payable April 3, 1939, to stockholders of record March 13, 1939.

Net sales of company for the year ended Dec. 31, 1938, were \$44,180,853. The preliminary consolidated net profit, subject to final audit, for the year ended Dec. 31, 1938, amounted to \$514,983, after deducting provision for de-

preciation of \$1,060,931 for plants and equipment and provision for Federal taxes on income of \$15,224. The above compares with net sales of \$73,451,555, and a net profit of \$3,571,669 for the year ended Dec. 31, 1937.

Houdaille Will Pay 62½ Cents Per Share

At a meeting held Feb. 16, 1939, the directors of Houdaille-Hershey Corp. declared the regular quarterly dividend of 62½ cents per share on its Class A No Par Value stock, payable April 1, 1939, to stockholders of record at the close of business on March 20, 1939.

Studebaker Sales Rose 57 Per Cent in January

The Studebaker Corp. reports January factory sales of passenger cars and trucks of 4736 against 3010 in 1938, an increase of 57 per cent. January sales compared with 4992 units sold in December, the seasonal contraction amounting this year to 5.1 per cent. A year earlier the decline in January from December sales amounted to 36 per cent, 3010 units being sold in Janu-

ary against 4720 in December. Retail deliveries of passenger cars and trucks in the United States last month amounted to 3171 against 3035 a year ago.

Early February Gains Reported by Buick

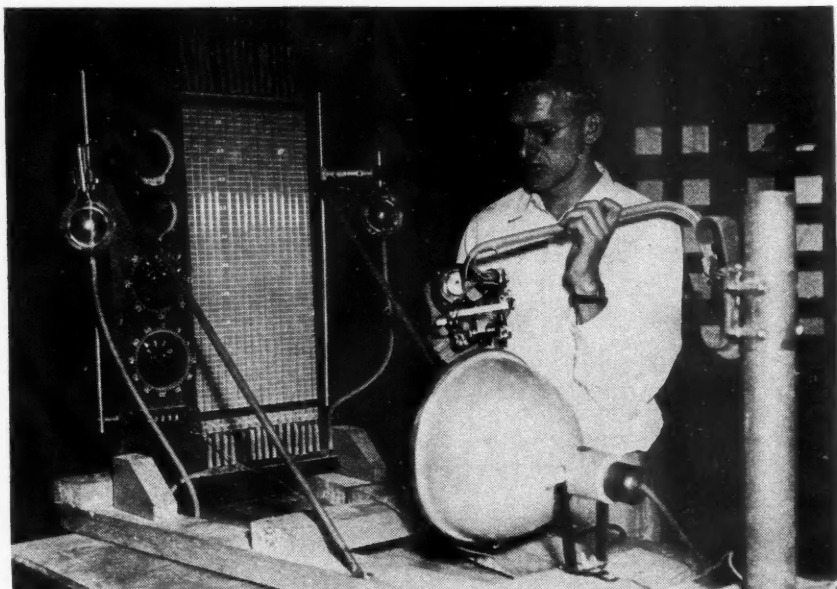
Domestic retail deliveries of Buick cars during the first 10 days of February totaled 3917 units, compared with 3626 in the first 10 days of January, a gain of 291 units or 8 per cent, and with 2860 in the corresponding February period last year, a gain of 1057 units or 37 per cent.

Used car stocks were reduced during the period with used car sales totalling 8688 against 7933 in the first January period and 8133 in the corresponding 10 days in February last year.

40 Years Ago

In Belgium a company has been formed for the purpose of establishing on all the principal high roads of Europe electric power stations, or electric posting stations for motor tourists. At each station there is to be a bar and restaurant, and a repair shop, which will be in charge of expert mechanics. Storage batteries can be recharged "while you wait," and medical attendance will be on hand in case of accidents.

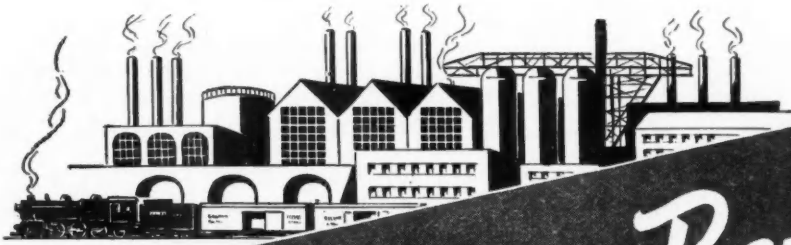
From *The Horseless Age*, February, 1899.



Acme

Air Velocity Device

Robert Schairier, graduate student at the California Institute of Technology, Pasadena, Calif., is shown with a recording motor and arm which indicates the velocity of air as it travels over the surface of an airplane wing. The speed of the air is recorded on the instrument shown at the left.



How Industry Benefits

FROM THIS NEW-TYPE QUILL BEARING

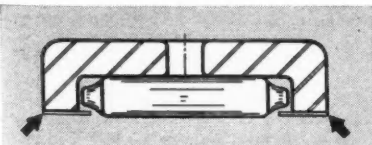
**WIDE
RANGE OF
SIZES
CARRIED
IN STOCK**



Correctly proportioned rollers with husky curvilinear trunnions eliminating high stresses on trunnions. Accurately hardened and ground for long life.



One-piece channel-shaped outer race. Rigid surfaces all accurately hardened and ground providing solid abutment for end of roller. Assures longer bearing life.



All fragile parts have been eliminated. Simplified method for definite roller retainment. Function of the retaining band is completed when bearing is assembled.

EACH separate type of Bantam Bearing has been designed and built to meet a recognized industrial need. The new **STANDARD SERIES QUILL BEARINGS** are Bantam's answer to industry's demand for quill bearings that require less space... permit high load capacity... are easier to assemble and insure greater reliability at definitely lower cost.

Users of large capacity radial bearings have been quick to recognize the fulfillment of these requirements. Test installations have brought quick repeat orders and many industries report notable savings in cost and improvements in performance.

Built to the same high quality as Bantam Quill Bearings used on the nation's famous diesel-powered streamlined trains, the low cost of this new-type bearing is due solely to simplified design and standardized quantity production. Carried in stock in sizes $\frac{3}{4}$ " to 5".

Write for Bulletin 103C which gives complete engineering data. For Needle Bearings to be used in lighter service write our affiliate, The Torrington Company, Torrington, Conn., and ask for Circular 19A.

BANTAM BEARINGS CORPORATION
SOUTH BEND, INDIANA

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Torrington, Conn.



BANTAM

BEARINGS

TAPERED ROLLER . . . STRAIGHT ROLLER . . . BALL BEARINGS

Expect General Increase In Tire Prices by March 1

The tire price increase initiated Feb. 15 by Firestone Tire & Rubber Co., probably will become industry-wide before March 1. With crude rubber prices advancing steadily under refusal of the International Crude Rubber Regulations Committee to increase the crude rubber export quota for the second quarter of 1939, and with observers seeing a strong possibility of 18 or 20-cent rubber by mid-summer, practically all tire manufacturers will follow the Firestone lead on retail price lists. Caught off-guard by Firestone's quick action following the crude rubber committee's action in Amsterdam Feb. 14, other manufacturers hurriedly began revamping their lists. General Tire & Rubber Co. and United States Rubber Co. announced their new prices Feb. 20.

The increases average 1 to 6 per cent on most passenger car tire sizes and 1 to 7 per cent on all truck tire sizes. No change has been made as yet in original equipment prices.

Speculative buying already has entered the crude rubber market and this, observers say, will accelerate the upward price trend. World stocks are low and will shrink considerably under a continuance of the 50 per cent quota.

Not since 1937 have tire prices moved upward. Due to rapidly rising crude prices, there were two 6 per cent tire price increases in the first quarter of 1937, and a 2 per cent upward adjustment in November.

Passenger Car and Truck Production

(U. S. and Canada)

	January, 1939	December, 1938	January 1938
Passenger Cars—U. S. and Canada			
Domestic Market—U. S.	263,232	305,900	130,273
Foreign Market—U. S.	16,808	20,106	25,232
Canada	11,404	15,518	13,385
Total	291,444	341,524	168,890
Trucks—U. S. and Canada			
Domestic Market—U. S.	48,155	48,252	35,491
Foreign Market—U. S.	10,957	14,088	18,532
Canada	3,390	3,152	4,239
Total	62,502	65,492	58,262
Total—Domestic Market—U. S.	311,387	354,152	165,764
Total—Foreign Market—U. S.	27,765	34,194	43,764
Total—Canada	14,794	18,670	17,624
Total—Cars and Trucks—U. S. and Canada	353,946	407,016	227,152

Automotive Progress on Parade At the Golden Gate Exposition

*Advances Made by Industry in Past Ten
Years Are Shown by Elaborate Exhibits*

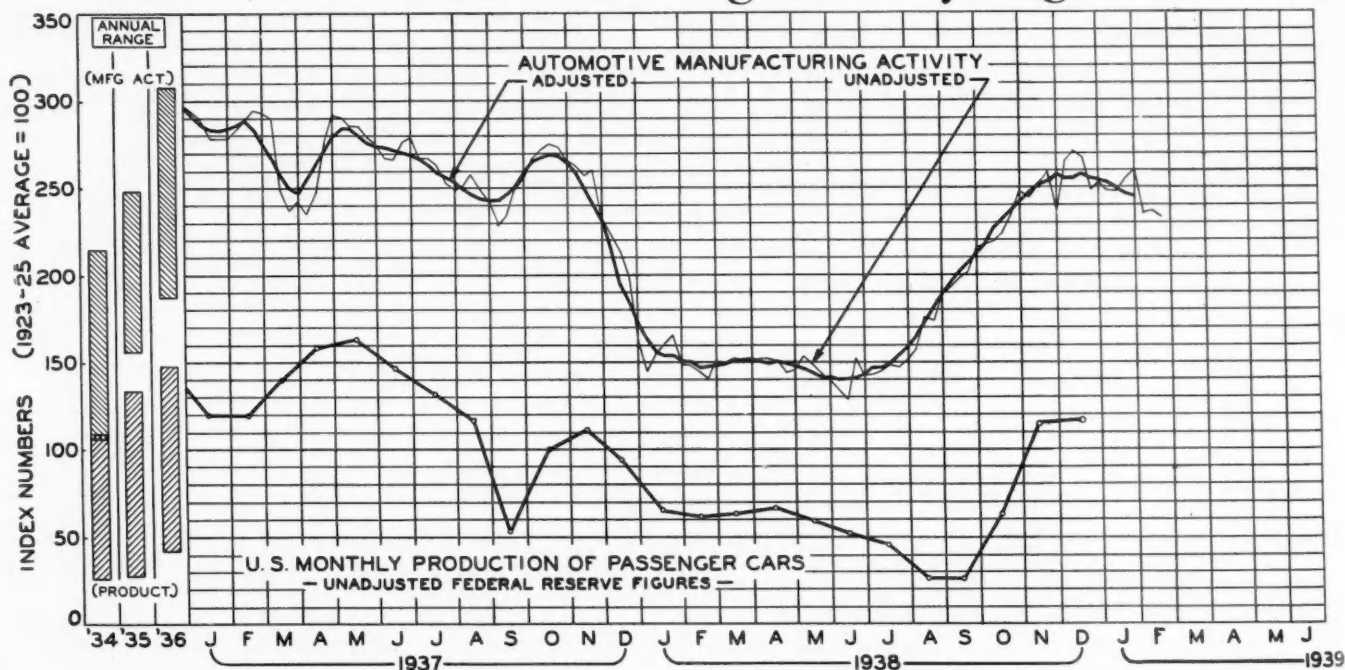
Progress of the past decade is the theme of exhibits by automotive groups who are displaying at Golden Gate International Exposition. Ford Motor Co. built their own building on the Court of Pacifica. Chrysler Corp., General Motors along with the petroleum groups are in the unique Vacationland Building.

The Ford exhibit, largest in point

of size, gives a dramatic presentation of the scope of the Ford industry. A "Fountain of Western Products" is the title of the exhibit in a horse-shoe shaped entrance hall opening off the court. The fountain displays the raw materials contributed by the Western States. These include sillimanite, copper, silver, lead, wood, petroleum, cattle,

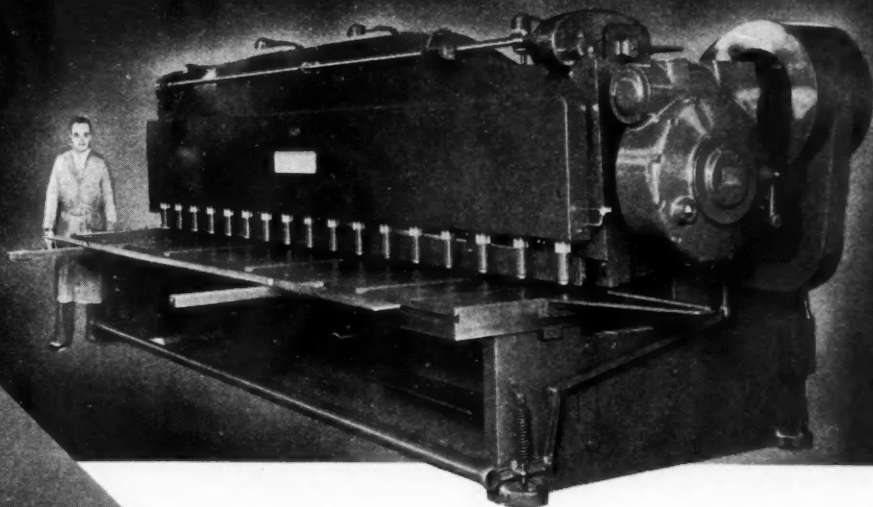
(Turn to page 270, please)

Automotive Manufacturing Activity Sags to 233



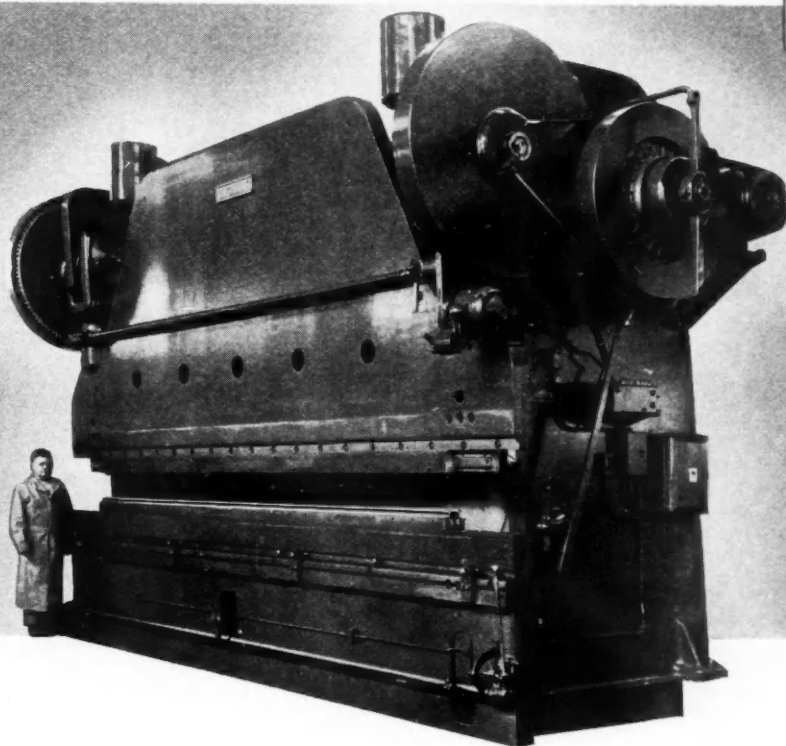
Manufacturing activity sagged again during the week ended Feb. 18, as indicated above by the light line tracing the path of the unadjusted index. The new mark of 233 falls four points below that registered the preceding week. Downward trend of the adjusted index

persists and the heavy black line now touches 245, two points below the last recording. However, as pointed out in the production review on page 251 of this issue, an upturn in productive rate is confidently expected during March.



ACCURATE SHEARING

ACCURATE FORMING



Parts just naturally go together
when sheared on a Cincinnati All-Steel
Shear or formed on a Cincinnati
All-Steel Press Brake.



THE CINCINNATI SHAPER COMPANY, CINCINNATI, OHIO

SHAPERS • SHEARS • BRAKES

Industrial Activity Continues At Steady Pace; Fisher's Index, 79.7

*An Exclusive and Regular Weekly Feature
Written by the Guarantee Trust Co., N. Y.*

Apparent general steadiness was the dominant feature of industrial activity last week. For the preceding week, ended Feb. 11, the *Journal of Commerce* index advanced to 85.4 from 84.9, as compared with 68.9 a year ago.

A pronounced increase in retail sales last week was reported by Dun &

Bradstreet, registering an estimated margin of 3 to 6 per cent above the comparable 1938 level. Department store sales in the week ended Feb. 11, according to data compiled by the Board of Governors of the Federal Reserve System, were only 2 per cent below the corresponding 1938 turn-

over, as against a comparable 6 per cent margin for the preceding week.

A further decline in the output of electricity by the light and power industry in the week ended Feb. 11 continued the usual seasonal trend; but the margin of this year's output above last year's comparable levels was raised to 10.5 per cent as against 9.8 per cent in the preceding week.

Railway freight loadings in the same week numbered 579,918 cars, as compared with 576,790 cars in the week before, and exceeded the loadings a year ago by 6.8 per cent.

Average production of crude oil in the week ended Feb. 11, was estimated at 3,283,700 barrels. The drop of 158,250 barrels from the average in the preceding week was a reflection of the resumption of a five-day production week in Texas. Current daily requirements, as computed by the U. S. Department of the Interior, are 3,220,000 barrels.

The average daily production of bituminous coal in the same period advanced to 1,424,000 tons, as compared with 1,346,000 tons in the preceding week and 1,125,000 tons a year ago.

Engineering construction awards in the week ended Feb. 16, totaled \$42,410,000, as against \$41,534,000 in the preceding week, according to *Engineering News-Record*. For the year to date awards are 30 per cent above the initial seven-week total last year.

Reported lumber production, shipments, and new orders declined in the week ended Feb. 11. As now estimated by the Department of Commerce, the national consumption of lumber in the first quarter of the year will exceed by 20 per cent the comparable use in 1938.

The seasonal slackening of cotton-mill activity in the week ended Feb. 11, was reflected in the unchanged index of the *New York Times*. The present level of 117.8 compares with 88.7 a year ago.

Professor Fisher's index of wholesale prices for the week ended Feb. 18 stands at 79.7, as against 79.5 for the week before and 79.8 for each of the three weeks preceding.

Reserves of member banks of the Federal Reserve System, continuing the decline recorded in recent weeks, dropped \$310,653,000 in the week ended Feb. 15. The decline of \$290,000,000 in estimated excess reserves brought the total to \$3,170,000,000. A reduction of \$2,335,000 in bills discounted by the Federal Reserve banks canceled nearly all the gain recorded in the preceding week.

GM-Cornell Index Moves Down to 60.7

The General Motors-Cornell World Price Index of 40 basic commodities for the week ended Feb. 11 was 60.7, compared with 60.9 for the previous week. The United States index in gold increased 0.6 point to 62.9.

UPHOLDING
QUALITY

SINCE 1906

ATLAS

MODERN
IN EVERY
THOUGHT
AND
PRACTICE

⊗

DROP
FORGINGS
FOR
ALL INDUSTRIES

COMPLETE LABORATORY CONTROL

ATLAS DROP FORGE CO. LANSING MICHIGAN

Pontiac Sales Up 64.3% in January

Retail deliveries of new Pontiac cars throughout the United States for the month of January were 10,360, an increase of 64.3 per cent over the 6304 sales of January, 1938, and a decrease of 27.7 per cent from the December figures of 14,335.

New car inventories in dealers' hands Jan. 31, were at 23,009 which is 25.9 per cent less than they were one year ago.

Sales of used cars increased steadily throughout January finishing strongly with a total of 23,797 which is an increase of 13 per cent over December and within 4.4 per cent of January, 1938, at which time intensive campaigns were under way everywhere in an effort to break the used car jam.

Used car inventories on Jan. 31 were 29,644, an increase of only 71 cars over the twentieth of the month and 25 per cent less than the high 39,357 figure of Jan. 31, 1938.

Thomas Truck Buys Wm. H. Sippel Corp.

Announcement has been made by J. F. Thomas, president and general manager of the Thomas Truck & Caster Co., Keokuk, Iowa, that his firm has purchased the business of the Wm. H. Sippel Corp., South Bend, Ind., manufacturers since 1925 of truck casters, floor trucks, industrial trailers, and skid platforms. The Sippel products will be combined with the Thomas line of casters and trucks, and all production carried on in the Keokuk plant.

Atlas Acquires Control Of Thornburg Diesel

Atlas Imperial Diesel Engine Co. has announced the consummation of negotiations through which it has acquired controlling interest in the further development and manufacture of "America's smallest Diesel engines."

A new company, Atlas-Thornburg Diesel Engines, Inc., has been organized to take over the assets of Thornburg-Diesel Engines, Inc., which developed and formerly manufactured the engines in a small way in North Kansas City, Mo. Atlas Imperial has acquired 51 per cent of the stock of the new corporation, the remaining 49 per cent having been distributed to stockholders of Thornburg Diesel. It is pointed out by P. H. Kilberry, president of Atlas, that this minority stock is subject to repurchase by Atlas-Thornburg at any time within three years.

The machinery, fixtures, jigs, inventory and other physical assets acquired from Thornburg are being moved to the Atlas plant at Mattoon, Ill., where the small engines will be built. Distribution of the engines will be through subsidiaries and factory-

controlled branches of Atlas Imperial, supplemented by a dealer organization to be developed in the United States and foreign countries.

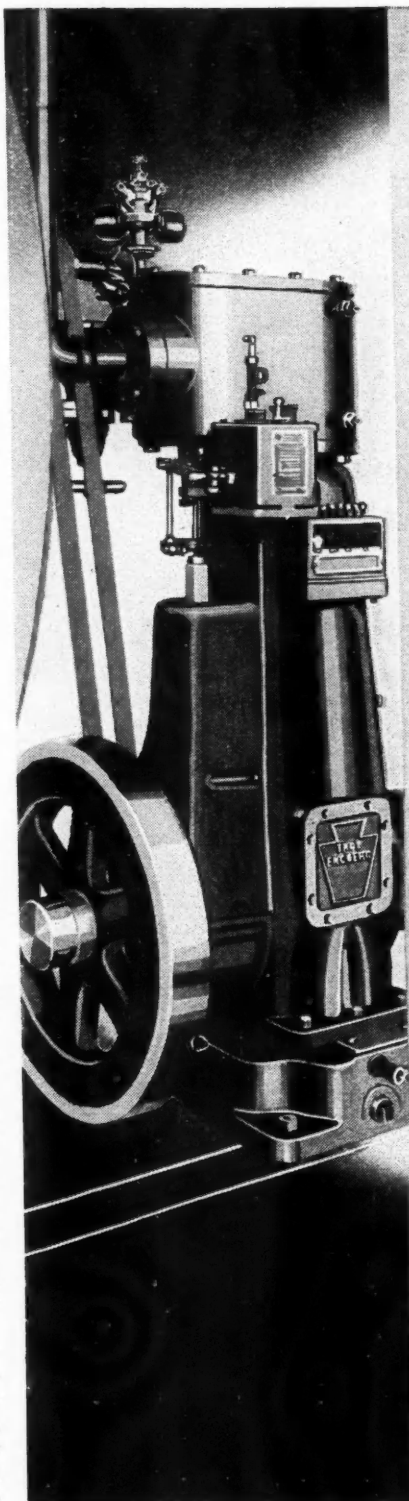
Harry A. House

Harry A. House, mechanical engineer and inventor of the first automobile in England, died recently at his home in Buffalo, N. Y. He was 73 years old. He had been vice-consul for the United States at Southampton for seven years.

Born in Bridgeport, Conn., he ac-

companied his father, Harry A. House, Sr., also an inventor, to England in 1889. Both first worked on a flying machine and became friends of the Wright brothers who called on them to inspect their work.

The father returned to Connecticut but the son remained in England and designed and built a horseless carriage, which was steam driven with a kerosene-burning engine and smokestack. It attained a speed of 30 miles an hour. Mr. House obtained patents and the first automobile license in England.



*Lubricate
cylinders
without
oil?*

Unusual as that may sound, oilless lubrication of cylinders is accepted practice with Troy-Engberg steam engines. Where exhaust steam free from any oil contamination is desired, TROY ENGINE & MACHINE CO. uses "dag" colloidal graphite in water instead of oil . . . fed into cylinders through special lubricators.

The colloidal graphite forms a heat-resistant lubricating film of graphite on the pistons, rods, and other engine parts requiring lubrication. Graphite films developed on heating pipes also improve heat conductivity.

Where oil in exhaust steam is not a problem, the addition of "dag" to lubricating oil may be effectively used to reduce oil feeds and costs.

Bulletin 150, containing complete data on lubrication of steam engine cylinders with "dag", is yours for the asking.

ACHESON COLLOIDS CORPORATION

PORT HURON • • • MICHIGAN



GM Dealer Case Hearings Again Postponed, Now Set for March 1

Ourselves and Government—A Check List Of Federal Action Corrected to Feb. 16

FEDERAL TRADE COMMISSION

VS. GENERAL MOTORS. Hearings which were resumed Feb. 15. at Albany, N. Y., and which were scheduled to be moved to Boston on Feb. 23 have been postponed to March 1. The case, identified as the exclusive dealing case, in-

volves the complaint that GM dealers allegedly are required to handle GM parts exclusively.

FOB PRICE CASE. Date for GM hearings in Detroit has been postponed from Feb. 21 to March 7. Hearings also due in the Ford case but date has not been set. It had previously been

scheduled for Jan. 25 but cancelled. The FTC is expected to close the Ford case immediately after the hearings. Both Ford and GM cases involve the FTC allegation that price advertising was misleading.

VS. UNITED STATES RUBBER CO. Respondents have asked for additional time to reply to the complaint and the FCC has further extended the time for filing from March 1 to March 4. The FTC alleged unlawful price discrimination in the sale of tires in violation of the Robinson-Patman Act. Also involved is the United States Tire Dealers Corp. of New York, a subsidiary.

CIVIL AERONAUTICS AUTHORITY

PURDUE UNIVERSITY, the first of 13 schools selected by the CAA to participate in the \$100,000 NYA flight training program, has enrolled 50 students and classes are under way. Contracts have been let for instruction at five other universities and bids on the remaining seven will be opened Feb. 20. This is the test phase of a program which, if Congress approves, will result in the annual training of approximately 20,000 student pilots.

TEMPORARY NATIONAL ECONOMIC COMMITTEE

FTC phase of the monopoly investigation will open with public hearings beginning Feb. 28 and lasting about two weeks. The steel, farm machinery, rubber and sulfur industries, together with six others, all in the food field, will be considered by the FTC.

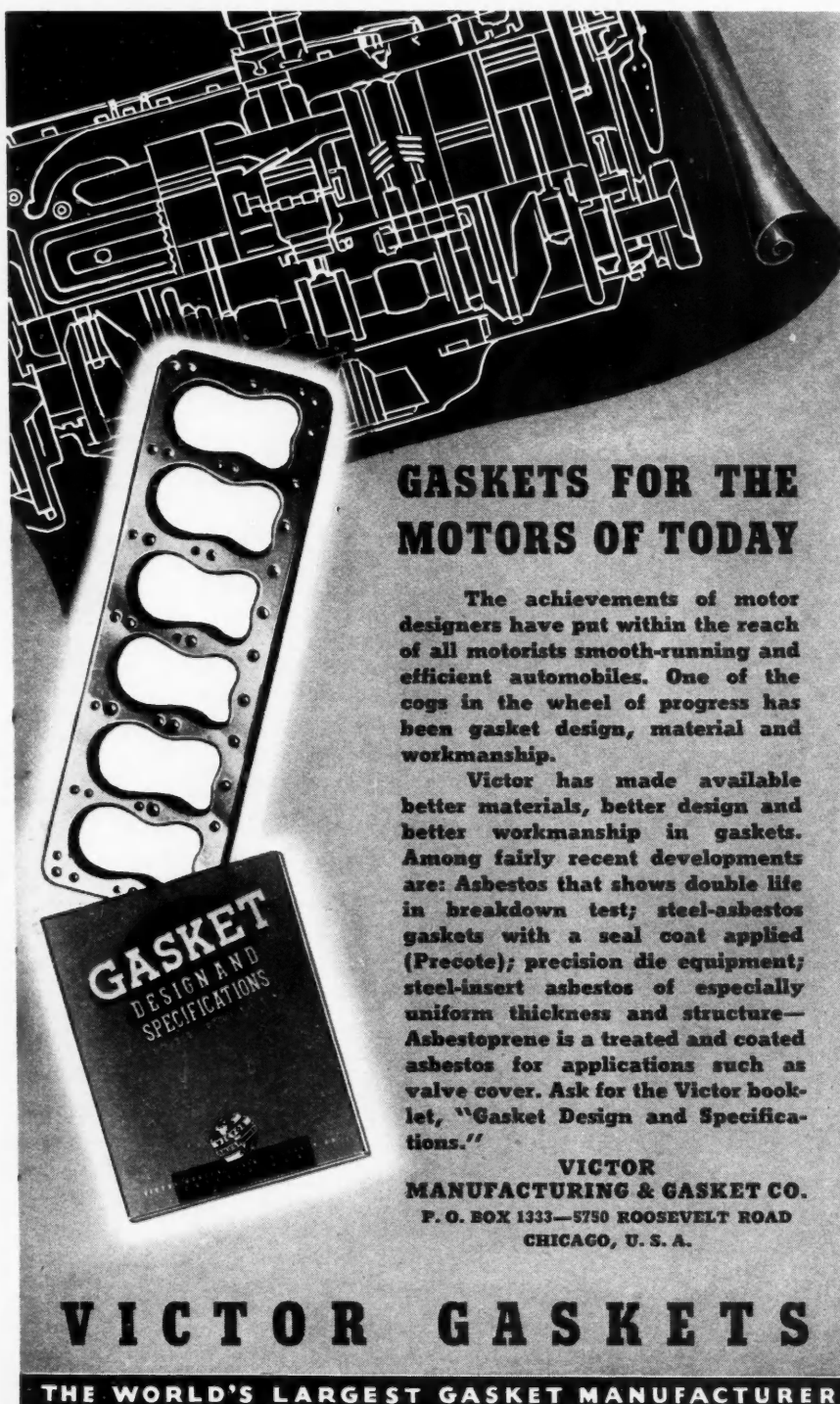
Government Suit

(Continued from page 251)

against the tire industry and that, thinking it will be successful in court, it will serve as a warning to other industries to stop the practice of submitting identical bids. Among such industries are steel, machinery, cement, lumber, electrical appliances, and many others. For the most part identical bidding is inherent in the nature of the pricing system of these industries. Quoting on a delivered price basis, the greater number of them, steel being a conspicuous example, use a multiple basing point system, and arrive at bids simply by quoting the price at the basing point nearest the source of delivery plus the freight.

"Bids identical to the last penny are not normally the result of identical cost of manufacture, identical marketing cost, and identical profit percentages independently arrived at," the Department statement said in summarizing its position.

It said that in the tire case the evidence of conspiracy consists of the submission by the 18 companies of four sets of bids on automobile tires that were identical to the penny in each in-



GASKETS FOR THE MOTORS OF TODAY

The achievements of motor designers have put within the reach of all motorists smooth-running and efficient automobiles. One of the cogs in the wheel of progress has been gasket design, material and workmanship.

Victor has made available better materials, better design and better workmanship in gaskets. Among fairly recent developments are: Asbestos that shows double life in breakdown test; steel-asbestos gaskets with a seal coat applied (Precote); precision die equipment; steel-insert asbestos of especially uniform thickness and structure—Asbestoprene is a treated and coated asbestos for applications such as valve cover. Ask for the Victor booklet, "Gasket Design and Specifications."

VICTOR MANUFACTURING & GASKET CO.
P. O. BOX 1333—5750 ROOSEVELT ROAD
CHICAGO, U. S. A.

VICTOR GASKETS

THE WORLD'S LARGEST GASKET MANUFACTURER

stance on 82 or more different sizes of tires.

The defendants are:

The Cooper Corp., The Dayton Rubber Mfg. Co., Dunlop Tire & Rubber Corp., The Falls Rubber Co., The Firestone Tire & Rubber Co., The Fisk Rubber Corp., The General Tire & Rubber Co., The B. F. Goodrich Co., The Goodyear Tire & Rubber Co., Inc., The Kelly-Springfield Tire Co., Lee Tire & Rubber Co. of N. Y., Inc., The Mohawk Rubber Co. of N. Y., Inc., The Norwalk Tire & Rubber Co., Pennsylvania Rubber Co., F. G. Schenuit Rubber Co., The Seiberling Rubber Co., United States Rubber Products, Inc., and U. S. Tire Dealers Corp.

Abstracts

Sleeve Valves For Aircraft Engines

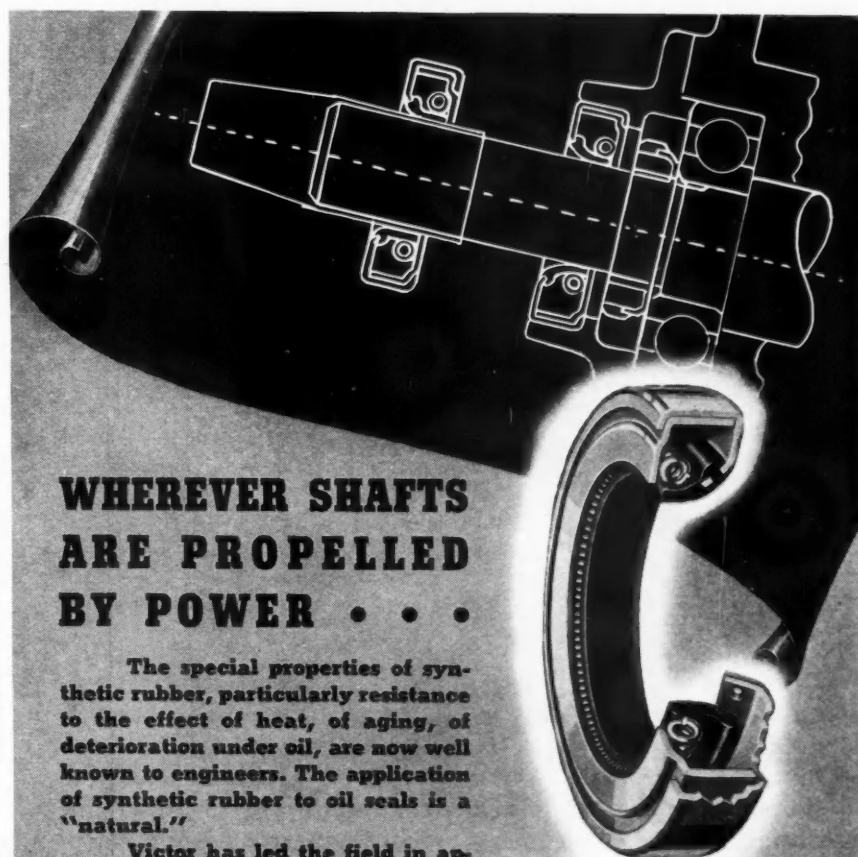
For aircraft engines the Burt-type single-sleeve valve has the advantages that it does away with the hot exhaust valve, thereby permitting of an increase in the compression ratio, and that it does away with a large number of "bits and pieces." Apparently the sleeve is not subject to either hot or cold corrosion, nor is it liable to suffer damage in case of operation on a weak (oxidizing) mixture. Such mixtures are used when maximum fuel economy is desired, and this point is therefor of great importance. Although it reduces the number of working parts to a minimum and eliminates the undesirable valve spring, it is more costly to produce than the poppet valve. But time and expense are saved in service, due to the fact that the sleeve valve needs no attention during the normal period between engine overhauls.

The Bristol Aeroplane and Engine Co. state that their sleeve-valve engines will run with a compression between one-half and one ratio higher than that of their poppet-valve models, on a fuel of given octane number, due to the elimination of the hot valve. However, these valves have a cooling medium in the stems only; the large American hollow-head valves do not run much above 1200 deg. Fahr. at full load, and they run at a much lower temperature at cruising power.

The Bristol sleeve-valve engine uses a forged aluminum cylinder barrel, with a sleeve of high-expansion steel, nitrided, and working directly in it. Liquid-cooled aircraft engines could have a similar arrangement, but because of the limitations of space in the case of in-line engines, would probably use a steel cylinder barrel. This would eliminate the need for a high-expansion steel, and a more normal steel could be used which could be hardened. —F. R. Banks in *I. A. E. Journal* for December.

Monthly Motor Vehicle Production (U. S. and Canada)

	PASSENGER CARS		TRUCKS		TOTAL MOTOR VEHICLES	
	1939	1938	1939	1938	1939	1938
January	291,444	168,890	62,502	58,262	353,946	227,152
February		151,133		51,464		202,597
March		186,341		52,256		238,597
April		190,111		48,018		238,129
May		168,599		41,575		210,174
June		147,545		41,857		189,402
July		112,114		38,336		150,450
August		61,687		35,259		96,946
September		69,449		20,174		89,623
October		192,906		22,380		215,286
November		335,767		54,638		390,405
December		341,524		65,492		407,016
Total		2,126,066		529,711		2,655,777

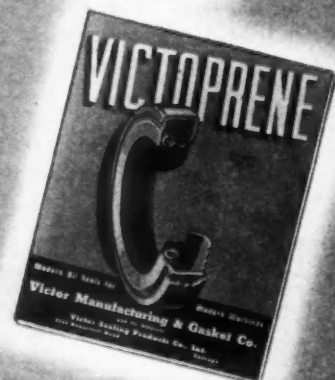


WHEREVER SHAFTS ARE PROPELLED BY POWER . . .

The special properties of synthetic rubber, particularly resistance to the effect of heat, of aging, of deterioration under oil, are now well known to engineers. The application of synthetic rubber to oil seals is a "natural."

Victor has led the field in applying synthetic rubber to oil sealing problems and the Victoprene oil seal has gone forward with leaps and bounds. Victoprene seals are now used with satisfaction in many applications where heretofore a satisfactory seal was difficult if not impossible to obtain. Ask for the catalog on Victoprene oil seals. The Victor Company solicits the opportunity to submit suggestions on oil sealing problems.

VICTOR
MANUFACTURING & GASKET CO.
 P. O. BOX 1333—5750 ROOSEVELT ROAD
 CHICAGO, U. S. A.



VICTOPRENE OIL SEALS

THE WORLD'S LARGEST GASKET MANUFACTURER

English Concern Adopts Direct Injection Design

In AUTOMOTIVE INDUSTRIES of Oct. 8 last an illustrated description was given of a new Diesel engine of the direct injection type that had been introduced by the Associated Equipment Co., London, and offered as an optional type to buyers of A.E.C. buses and trucks. The alternative was the turbulence chamber type that alone had been made by this company for over 10 years, under Ricardo patents for a considerable proportion of that period. It has now been decided to adopt the

direct injection design in three sizes as standard; the other will be supplied only to special order.

The new unit, it is stated, was introduced originally in response to an insistent demand from operators for a reduced rate of fuel consumption; it effected a 10 per cent economy in comparison with the turbulence chamber variety, with nothing of importance but the cylinder head and piston design being varied.

The Associated Equipment Co. is one of the biggest truck and bus manufacturing concerns in England. Originally it was organized to build London's buses as a subsidiary of the London

General Omnibus Co.; trucks were subsequently added to its products. When the London Transport Board took over the whole of the Metropolitan passenger transport—buses, underground railroads and tramcars—A.E.C. became dissociated with the bus operating interests, but has continued to supply a large number of gas, oil and trolley buses for London, as well as elsewhere, and a range of heavy duty trucks.

GM Must Stand Trial In Anti-Trust Case

General Motors Corporation and its affiliated finance companies together with officials of those firms must stand trial in United States district court, South Bend, for alleged violation of the federal anti-trust laws. Federal Judge Thomas W. Slick has overruled a demurrer filed by General Motors and fellow defendants against an indictment returned last May by the federal grand jury in South Bend.

Two avenues remain open for General Motors and others named in the indictment. They may fight the case in court as they have indicated they would do or seek to reach a consent decree agreement with the federal government in which they would agree to cease practices of which they are accused.

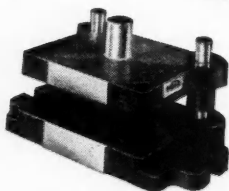
The Ford Motor Company and the Chrysler Corporation along with their affiliated finance companies were also indicted last spring for similar alleged violations of the anti-trust laws. Both these firms and their co-defendants signed consent decrees with the federal government. These consent decrees, however, become null and void in the event General Motors successfully defends itself and is acquitted in court.

IT'S A GOOD DEAL THAT SAVES BOTH SIDES MONEY

= \$ =



Die Makers know that Danly Die Sets are accurate in every dimension—there are no added, unpaid costs for further machining, or truing up—no lost time in trying and fitting in mounting the die.



Die Users know that dies mounted in Danly Die Sets give them lower cost stamping in freedom from shearing—accurate and faster production—longer runs between regrinds—and more stampings per die.

DIE BUYERS—Specify Danly Die Sets for Your Dies

DIE MAKERS—Include Danly Die Sets in Your Estimates

It will be good business for you both

DANLY MACHINE SPECIALTIES, Inc., 2112 So. 52nd Ave., Chicago, Ill.

DANLY DIE SETS AND DIE MAKERS' SUPPLIES FROM THE 8 DANLY BRANCH OFFICE STOCKS

LONG ISLAND CITY, N. Y. 36-12 34th STREET	DETROIT, MICHIGAN 1549 TEMPLE AVENUE	CLEVELAND, OHIO 1745 ROCKWELL AVENUE	DAYTON, OHIO 990 E. MONUMENT AVENUE
PHILADELPHIA, PA. 3913 N. BROAD STREET	ROCHESTER, N. Y. 16 COMMERCIAL STREET	MILWAUKEE, WIS. 513 EAST BUFFALO STREET	

DANLY DIE SETS and DIE MAKERS' SUPPLIES

Their Dependable Quality Means Lower Cost Stampings

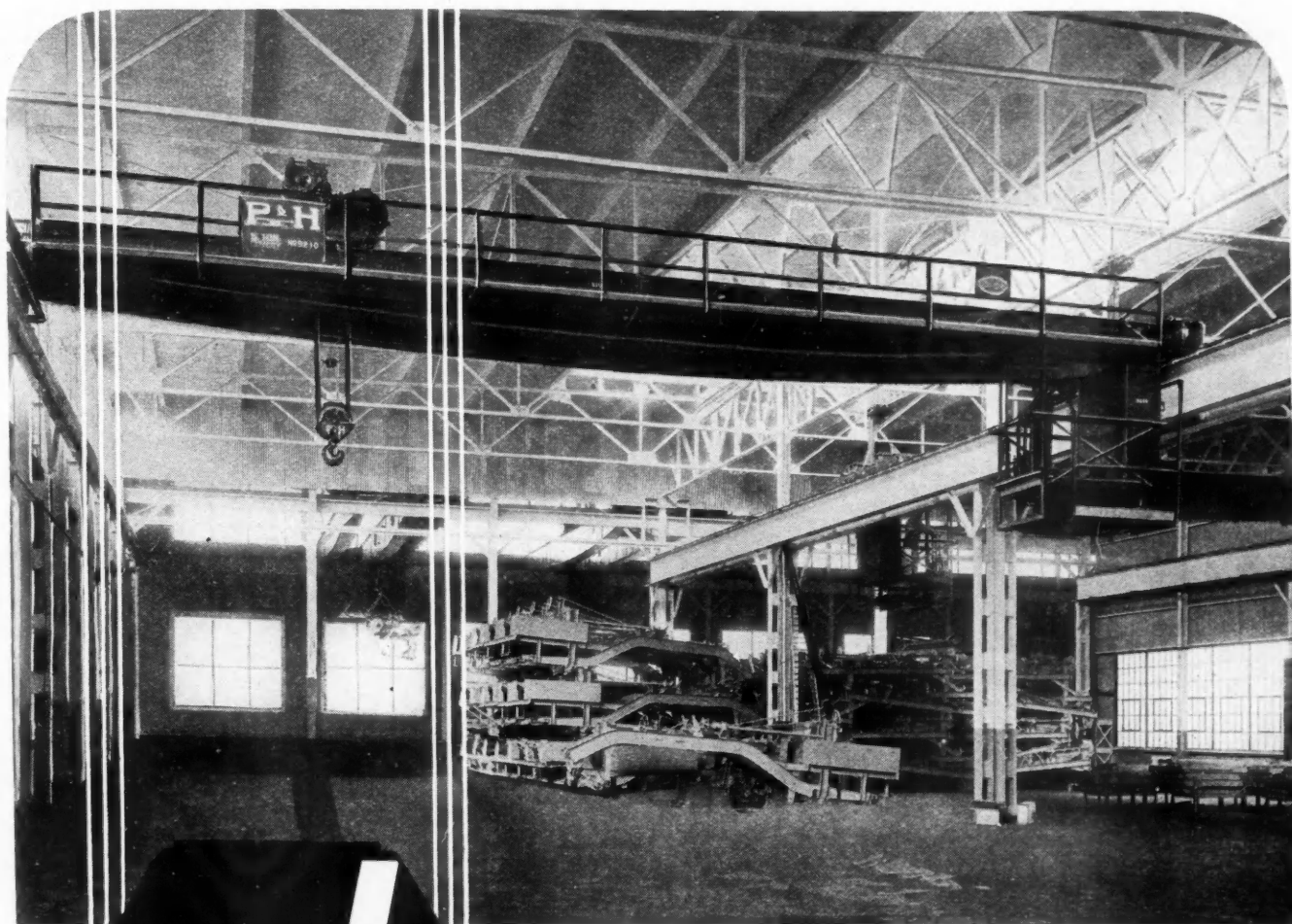
Calendar

Conventions and Meetings

SAE National Aeronautic Meeting, Washington	March 16-17
American Foundrymen's Association, Forty-third Annual Convention, Cincinnati	May 15-18
SAE World Automotive Engineering Congress	May 22-June 8

Shows at Home and Abroad

Sixteenth International Automobile Exhibition, Geneva, Switzerland,	March 3-12
A.S.T.E. Machine and Tool Progress Exhibition, Convention Hall, Detroit	March 14-18
Yugoslavia, Belgrade, Automobile Salon	April 1-8
Great Britain, London, Automobile Show	Oct. 12-21
Italy, Milan, Automobile Salon,	Oct. 25 to Nov. 11
International Automobile, Motorcycle and Motor Boat Show, Budapest,	Oct. 27 to Nov. 6
Great Britain, London, Commercial Automobile Transportation Show,	Nov. 2-11
Great Britain, Glasgow, Scotch Auto- mobile Show	Nov. 10-18



ELECTRIC CRANES

You may be sure that your material-handling equipment, built by this group of specialists, will solve your problems in the most efficient manner. The experience of over 50 years . . . of building more than 10,000 cranes . . . is at your disposal through America's largest builder of overhead handling equipment. Harnischfeger Corporation, 4559 West National Avenue, Milwaukee, Wis.

**ALL CAPACITIES FROM
5 TO 300 TONS**

HARNISCHFEGER

CORPORATION

ELECTRIC CRANES • EXCAVATORS • ARC WELDERS



HOISTS • WELDING ELECTRODES • MOTORS

Work at Plymouth Interrupted By Anti-Martin Faction Strike

Temporary Stoppage Resulted When Company Refused to Discriminate Between Two Groups

First actual work stoppage to result from the inter-UAW factional fight took place at the Plymouth division of the Chrysler Corp. on Feb. 22, when the plant closed down at noon after members of the Plymouth local supporting the anti-Martin faction called a strike. To prevent trouble the man-

agement closed the plant which was followed by closing of the Briggs body plant supplying Plymouth bodies.

Approximately 28,000 workers were affected including 10,000 at Plymouth, 15,000 at Briggs and 3000 at Dodge working on Plymouth materials. The plant reopened on Feb. 23 with the

announcement that it would be open for all men wishing to work. According to Plymouth officials enough men reported to permit operating one assembly line instead of the two normally operating.

The Plymouth local has been one of the storm centers of the UAW factional fight. Original officers, opposed to Martin, have been suspended by him and the local itself has divided into two factions. When the anti-Martin faction demanded sole bargaining rights, and the management refused to meet with it alone, members of the faction were ordered by their leaders to leave their machines. According to H. L. Weckler, vice-president of Chrysler in charge of operations, the management agreed to meet with the anti-Martin faction if representatives of the other faction also could be present. The management refused to discriminate between factions and the work stoppage resulted.

"The cessation of operations at Plymouth is not due to any lack of willingness on the part of Chrysler Corp. to do business with the UAW," Weckler said, "it is due entirely to the controversy within the UAW itself."

Announcement by John L. Lewis that the CIO would excommunicate all UAW locals sending delegates to the convention called by Homer Martin, embattled leader of the opposing faction, in Detroit, on March 4, indicates the serious concern that labor leaders are showing over the bitter struggle for control of the huge automobile workers' union.

Although claiming a constantly increasing lead over Martin in the campaign for support of UAW locals, the CIO contingent is continuing an intensive drive in territories where Martin's strength is greatest. According to reports there are more CIO organizers at work fighting Martin than there ever were to help UAW when automobile labor was being organized.

As the struggle for control entered its final rounds the CIO faction, led by R. J. Thomas, was claiming support of locals representing more than 286,000 out of a total membership of 375,000, while Martin in his latest radio appeals was claiming support of more than 200,000.

Tom Moss Replaces J. D. Burke at Dodge

The appointment of Tom W. Moss as director of Dodge truck sales to succeed J. D. Burke, resigned, was announced this week by Forest H. Akers, vice-president and director of sales of the Dodge Division of Chrysler Corp.

Mr. Moss, who for the past five years has been general service manager of the Chrysler Corp. in direction of the corporation's service activities relating to Plymouth, Dodge, DeSoto and Chrysler divisions, assumed his new duties immediately.



• • • Unequalled SURFACE SMOOTHNESS and SPHERICITY

The series of lapping operations performed as a matter of course in the Strom plant give Strom Steel Balls a degree of surface smoothness and sphericity that has always been unequalled in any other regular grade of ball. Only through such unique lapping practice can extreme precision be obtained.

Physical soundness, correct hardness, size accuracy, and sphericity are guaranteed unconditionally in all Strom Balls.

Other types of balls—*stainless steel, monel, brass and bronze*—are also available in all standard sizes. Write for catalog and prices.

Strom

STEEL BALL CO.

1850 So. 54th Avenue, Cicero, Ill.

The largest independent and exclusive Metal Ball Manufacturer

**A. N. BENSON**

... who has resigned as general manager of the National Automobile Dealers Association.

Benson Resigns N.A.D.A. Post

A. N. Benson, general manager of the National Automobile Dealers Association, announced his resignation on Feb. 22 to take effect immediately. The resignation was accepted by the N.A.D.A. executive committee.

Prior to his affiliation with the N.A.D.A., Mr. Benson served for 12 years as general manager of the Minnesota Automobile Dealers Association. He joined the N.A.D.A. executive staff on March 1, 1936, and in April of that year was made general manager. No announcement of his future plans has been made.

Pending appointment of a new manager, W. E. Blanchard, assistant general manager, will serve as acting manager.

Men

Thomas F. Laughlin, with Studebaker for the past 24 years, chiefly on the Pacific Coast, has been made assistant sales manager to C. Scott Fletcher with headquarters in South Bend. Laughlin was formerly regional manager of the Studebaker Pacific Corp. in Los Angeles. Another new appointment is that of Courtney Johnson as regional supervisor with temporary headquarters in Chicago.

Frank Van Eiszner, for the past four years sales promotion manager in Philadelphia for Roche, Williams & Cunningham, Studebaker's advertising agency, has been appointed district sales manager for Studebaker with headquarters in Philadelphia.

Henry S. Beal, formerly of Chicago, has become associated with The Heald Machine Co. in the position of general manager. Mr. Beal was manager of Jones & Lamson Machine Co., Springfield, Vt., and served the National Machine Tool Builders' Association as president. More recently he has been president of Sullivan Machinery Corp., Chicago.

L. E. Ulrope, regional manager of sales, has been elected a vice-president and director of the Colonial Beacon Oil Co.

Harold Glenn Moulton, president, The Brookings Institution, Washington, D. C., is to be the featured speaker at the preview dinner preceding the opening of the Machine and Tool Progress Exhibition in Detroit on March 13.

C. M. Eason was elected president, E. R. Estberg, treasurer, and John J. Pfeffer, secretary of the Industrial Clutch Co., Waukesha, Wis., at the annual meeting this month.



ONLY LAPPING As Strom Does It CAN PRODUCE SUCH PRECISION

Strom Steel Balls possess a degree of surface smoothness and sphericity that has never been equalled in any other regular grade of ball. Such precision is exclusive with Strom because it can be attained only through a series of lapping operations such as are standard practice in the Strom plant.

Physical soundness, correct hardness, size accuracy and sphericity are guaranteed in all Strom Balls.

Other types of balls—*stainless steel, monel, brass and bronze*—are also available in all standard sizes.

Write for complete details.

Strom

STEEL BALL CO.

1850 So. 54th Avenue, Cicero, Ill.

The largest independent and exclusive Metal Ball Manufacturer

Advertising

F. A. Berend, advertising manager, Pontiac Motors division, General Motors Corp., announced an additional expenditure of \$936,000, to be spent in March, April, and May. This augments the largest advertising outlay of the company in five years.

June & Co., a new advertising agency with offices in the General Motors Bldg., Detroit, has been organized by Robert and John D. June. Among the new

agency's accounts are Alma Motor Co., four-wheel units; Clipper Belt Lacer Co.; Federal Back-Up Signal Co., automotive specialties; Hill Diesel Engine Co., and United Engine Co.

The much-discussed \$300,000 advertising campaign of the Air Transport Association of America, Chicago, has been awarded to Erwin, Wasey & Co. Homer McKee, veteran advertising man, has been named head of the firm's Chicago office. Roger M. Combs, Jr., is the account executive. He was formerly sales promotion manager of American Airlines.

Stanley Pflaum Associates, Chicago,

has been appointed advertising counsel by General Finance Corp., automobile financing company.

National Trailways System, an association of 37 bus lines with headquarters in Chicago, has named Needham, Louis & Brorby its agency, with Erwin Miessler account executive.

Loyola Guerin, in charge of planning and coordination of market research, sales promotion, and advertising policies of G. M. Basford Co., New York, has been appointed assistant to the president. He was formerly with General Motors Corp.

Harold Golden, who some years ago was connected with automotive accounts, has joined Mason Barlow & Associates, Chicago.

Griffes & Bell, New York agency, which had among other accounts the Briggs Clarifier Co., Washington, D. C., has suspended its business.

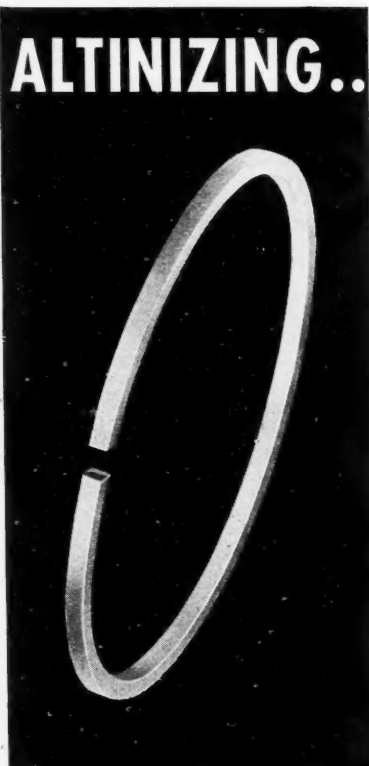
An extensive campaign of Johns-Manville Corp. on factory and plant insulation has been launched through J. Walter Thompson, New York.

General Tire & Rubber Co. has upped its appropriations for a campaign to start in March, the D'Arcy Advertising Agency, Cleveland, announced.

"Our 1939 advertising appropriation, which is one of the largest in the history of the Perfect Circle Co., represents the first step in our movement to promote greater safety on the highways and at the same time to broaden the piston ring market. Heretofore, piston ring advertising merely emphasized the need of stopping oil pumping, and while this is still one of the fundamental purposes for which rings are installed, we feel that our advertising should be directed more to those motorists whose cars have lost their original efficiency." So stated G. W. Stout, the company's advertising manager, in announcing its new campaign. Heading the list of national publications to be used this year are *The Saturday Evening Post* and *Country Gentleman*. A heavy trade paper schedule has also been approved, according to Mr. Stout.

Sales executives of United Motors Service and service engineers of the Delco Brake division of General Motors will hold meetings at all United Motors Service branches, starting at the Detroit branch Feb. 25 and continuing through April 16. These meetings are to introduce to the trade the 1939 merchandising program on Delco Brakes. H. B. Smith, merchandising manager of Delco Brakes for United Motors Service, assisted by Frank Plovick and Robert Curry, will conduct the meetings.

Fruehauf Trailer Co., assumes the role of Saint George in a one-company campaign to offset recent claims by railroads that trucks are causing their ruin. The theme is the truck's place in the national economy.



A McQuay-Norris Development Has Become a Trend

Altinizing is an electrolytic deposition of tin on the wearing surface of a piston ring. It prevents scuffing during the initial running in of the engine thereby improving performance and increasing ring life.

*Send all inquiries to
McQuay-Norris, St. Louis, Missouri*

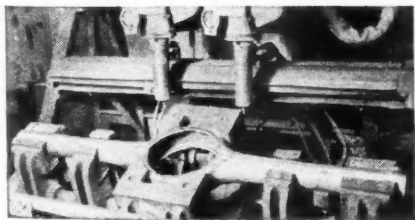
McQUAY-NORRIS
MANUFACTURING COMPANY
ST. LOUIS, MO.

You too can cut the cost of REAR AXLE HOUSINGS with the "Electronic Tornado"

HERE'S HOW—

Automotive plants and their fabricators are now using the Lincoln "Electronic Tornado" for the fabrication of rear axle housings (and many other automotive parts) because of the following cost-cutting advantages:

1. First installation cost for this simplified and compact automatic carbon arc welding equipment is low.



In this plant, the Electronic Tornado welds rear axle housings complete in 43 seconds. The completed housing in the fixture is shown.

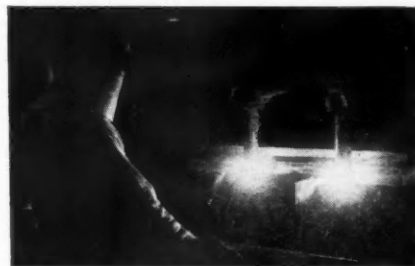
2. Material costs are minimized because no metal is added and none is burned away.

3. Cost of expendable materials (carbons, flux and electric power) used in this process is low.

4. The finished weld is smooth and clean. No grinding is necessary.

5. Produced by the "shielded-arc" process, the weld is consistently of uniform high quality—eliminating repairs or rejects.

6. When changes in models or designs are made, the "Electronic Tornado" can be adapted to the modified or new



"Electronic Tornados" are used extensively for production of axle housings, mufflers, torque tubes, starter and generator frames and other automotive parts.

welding fixture at a saving in cost.

You too can secure these benefits. The nearest Lincoln office, experienced in the application of the "Electronic Tornado" to automotive parts and problems, is at your service. Call them in today. No obligation.

Largest Manufacturers of Arc Welding Equipment in the World

THE LINCOLN ELECTRIC COMPANY
DEPT. KK-578 **CLEVELAND, OHIO**

Goodyear Spends \$400,000 For Centennial Celebration

Tire Company Presented Akron with Statue Of Discoverer of Vulcanization Process

The centennial of Charles Goodyear's discovery of the process of rubber vulcanization was observed with a city-wide Akron celebration sponsored by the Goodyear Tire & Rubber Co., Feb. 23, when the company presented the city a large statue of Charles Goodyear,

erected in a new civic mall facing the Akron Municipal Building. At a banquet attended by more than 1600 at the Akron Armory following the dedication of the statue and mall, Gov. John W. Bricker of Ohio spoke, both national radio networks carrying his

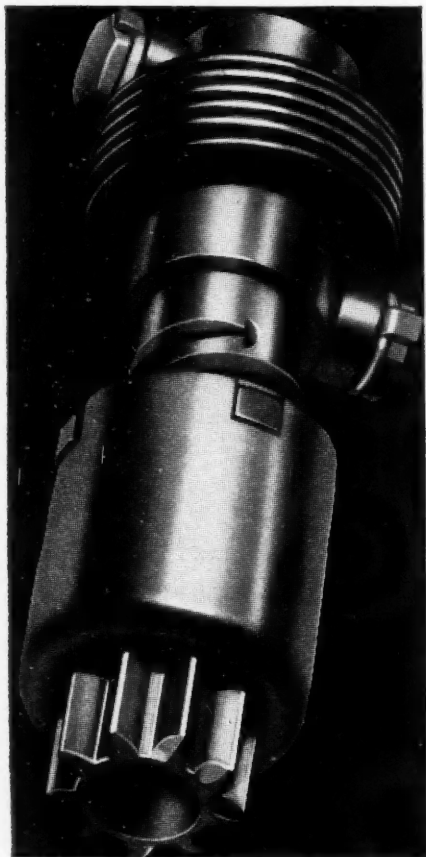
message over their entire systems.

The Goodyear centennial coincided with the Goodyear company's fortieth anniversary and home coming, for which it brought more than 2000 officials to Akron from all parts of the world. The entire celebration is said to have cost Goodyear approximately \$400,000.

Gen. Hugh S. Johnson addressed the Goodyear home coming rally, Feb. 21, at the Goodyear gymnasium which has been converted into a miniature world's fair of rubber. Special tributes were paid to F. A. Seiberling and C. W. Seiberling, founders of Goodyear and president and vice-president for many years of that company. Both are now officials of the Seiberling Rubber Co. P. W. Litchfield, F. A. Seiberling's first factory superintendent at Goodyear, now is Goodyear's president and chairman.

Preceding the Akron celebration, the City of Woburn, Mass., where Charles Goodyear made his discovery in 1839, staged a Goodyear centennial program Feb. 17, C. W. Seiberling presenting the city with a Goodyear memorial plaque on behalf of the Goodyear company and the City of Akron.

There are *billions* of starts behind a **BENDIX DRIVE**



A MIGHTY impressive record stacks up behind the Bendix Drive. One of the world's most widely used automotive units, it has been faithfully starting millions of cars automatically many times a day for many years.

The Bendix Drive is simple, reliable and virtually trouble-proof. At the touch of a starter button, it takes hold—starts the engine—lets go—and then protects the starter from damage by unintended operation.

Car owners take such dependability somewhat for granted. But there's a lot behind that unfailing service... a lot of experience in knowing how to build right and sticking to the strictest specifications in materials and workmanship.

Bendix Drive is built in sizes and types to start every kind of automobile, marine or Diesel engine.

**ECLIPSE MACHINE DIVISION
BENDIX AVIATION CORPORATION
ELMIRA, NEW YORK**

Production

(Continued from page 251)

ing weeks picking up the slack.

Sales currently are reflecting seasonal influences although they are averaging about the same percentage over February last year as they did in January.

Ford's total for the week, including Mercury and Lincoln-Zephyr was down somewhat with some divisions operating on a four-day schedule instead of five days, and the Chrysler total also was down because of a labor dispute between UAW factions which closed down Plymouth completely for part of one day and permitted operation of only one assembly line instead of two on the next. Aside from a slight downward revision at Cadillac-LaSalle, General Motors divisions maintained approximately the pace in effect throughout February. Graham was expected to complete about 200 cars this week and Willys plants also were in partial production. Packard, Hudson and Nash expected to continue on their present basis while Studebaker was off about 1200 units for the week.—J. A. L.

Maryland Car Dealers Vote Against Licensing

Car dealers of Maryland voted not to support proposed dealer licensing legislation at a state-wide meeting of the Automobile Trade Association of Maryland, in Baltimore, on Feb. 21.

Representative Ruth Shoemaker has placed before the state legislature a bill licensing new and used car dealers and their salesmen, and prohibiting the

Acknowledgment

In this, the 21st Annual Statistical Issue of **AUTOMOTIVE INDUSTRIES**, we have attempted to show in logical sequence the production, export, sale and registration of motor vehicles throughout the world. In addition are shown the design features of vehicles and engines of every description used in transportation on land, water and in the air. Some additions and deletions have been made in the material shown in previous similar issues. For the first time in many years we do not give any foreign specifications of passenger cars, aircraft or Diesel engines. We hope, however, to be able to bring this interesting feature back into the magazine just as soon as political and economic conditions in foreign countries are more stable.

To all who so willingly cooperated with us in supplying source material for the various tabulations in this annual statistical issue, our sincere thanks and appreciation. Without their aid we would have been unable to present this comprehensive picture of the industry.

Particular thanks are due the motor vehicle commissioners of the various states, to G. C. Thornburgh, vice-president, R. L. Polk & Co.; I. H. Taylor, chief, Automotive-Aeronautics Trade Division, Bureau of Foreign and Domestic Commerce, and George Quisenberry, editor, *The American Automobile* (Overseas Edition) and *El Automovil Americano*, export affiliates of **AUTOMOTIVE INDUSTRIES**.—M. A.

practice of "wilful and habitual over-allowances in used car trading." In the secret ballot, asking dealers' favor regarding the proposed law, the vote was negative by a close margin.

Natchez Builds Tire Plant for Armstrong

The Armstrong Tire & Rubber Co. will open a new \$300,000 automobile tire factory in Natchez, Miss., March 1. It was built by the city of Natchez, marking the latest development in Mississippi's program to "balance agriculture with industry."

Construction of the new Natchez factory, warehouse and offices was financed by a \$300,000 municipal bond issue, and the plant leased to the Armstrong Company. The city also provided water, sewerage and road facilities. The Armstrong Company agreed to install at least \$500,000 worth of equipment, insure the plant, and keep it in good repair. The company is to pay \$50 a month rent for a period of five years. At the end of the five-year lease period it may purchase the plant, which then goes on the tax rolls.

The factory promises a \$2,500,000 payroll for the five-year period, exclusive of executive salaries, with the proviso for a 10 per cent payment to the city on any deficiencies in the payroll. The plant will supply the municipality with tires for city-owned automobiles.

Municipalities in other states have within recent years offered tax exemption and other inducements to secure industries, but Mississippi cities are

the first authorized to finance directly.

The tire factory is Natchez's second venture under the industrial program.

Financing in December Increased 8.6 Per Cent

Dollar volume of retail automobile financing for December, 1938, amounted to \$99,419,283, an increase of 8.6 per cent when compared with November, 1938, an increase of 9.6 per cent as compared with December, 1937, and a decrease of 32.9 per cent as compared with December, 1936, according to a report issued by the Department of Commerce, Bureau of the Census. The vol-

ume of wholesale financing for December, 1938 amounted to \$163,508,239, an increase of 25.1 per cent when compared with November, 1938, an increase of 17.6 per cent compared with December, 1937, a decrease of 11.9 per cent compared with December, 1936.

Wholesale financing reported for the year 1938 amounted to \$990,942,919, a decrease of 47.5 per cent as compared with 1937, and a decrease of 41.8 per cent as compared with 1936, and the volume of retail financing amounted to \$1,010,864,033, a decrease of 41.3 per cent as compared with 1937, and a decrease of 41.1 per cent as compared with 1936.



"It's the best of the Bessemer," say production men who have standardized on Ultra-Cut Screw Stock since "way back when."

On performance alone, this high-sulphur grade of Bessemer Cold Finished Steel is a tribute to the development work of B & L engineers and to the closely controlled methods of manufacture in B & L mills.

You will find it "built to order" for a great variety of fabricated automotive parts. It is ideal for modern types of high speed automatics, particularly for intricate machining jobs where a smooth, bright finish and clean cut threads are all-important.

For a low-premium screw stock with a high rate of production, you can't beat B & L Ultra-Cut steel for economy.

B & L

Service Engineers invite your inquiries on Screw Stock Problems

Cold Drawn Bars - Ground Shafting - Screw Stock - Lead Steels - Alloy Steels

BLISS & LAUGHLIN, INC.

HARVEY, ILL. Sales Offices in all Principal Cities BUFFALO, N.Y.

Tokyo Frowns on Plans to Build Motorcar Industry in Manchuria

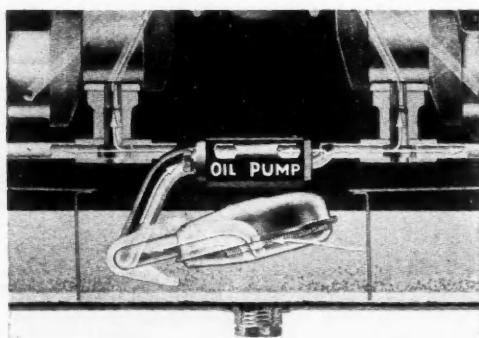
Japanese Ministry Sees Market Threatened If Giant Plant Is Constructed on Continent

The idea of building up a separate motorcar industry in Manchuria has finally lost favor with officials of the Department of Commerce and Industry in Tokyo, according to the *Nikkan Kogyo Shimbun*. The ministry is believed rather to have urged Yoshisuke Aikawa, president of the Manchuria

Industrial Development Corp., who once announced a plan to build a giant automobile plant in Manchuria with the financial assistance of American motor interests, to be satisfied with the progress of Japanese plants, two of which he controls.

The ministry is understood to have

particularly discouraged Mr. Aikawa's plan to draw the Ford Motor Company into the scheme. If anything on the scale envisaged by Mr. Aikawa were attempted in Manchuria, the Japanese industry, which is placing great hopes on the continent as a market, may run into difficulties once normal conditions are restored and military orders peter out, Mr. Aikawa was reportedly told. Nevertheless the much-mooted automobile scheme has bobbed up again as Mr. Aikawa has recently dispatched several executives of his concern to the United States, apparently to contact Ford officials.



The following outstanding manufacturers use FLOAT-O

Auburn	Int'l Harv. Co.
Buda	Lycoming Motors
Buick	Morris Motors,
Cadillac-La Salle	Ltd.
Chrysler	Otto Engine
General Motors	Packard
Corp.	Pierce-Arrow
Diesel Engine	Seagrave Corp.
Division	Sterling Engine
Gen'l Motors of	Studebaker
Canada Ltd.	White Motors
General Motors	Willys-Overland
Truck and Coach	Wolseley Motors
	Ltd.
Other prominent builders definitely committed for 1940 models.	
FLOAT-O Engineers are ready to consult with you.	

From the Lowest to the Highest Priced
Cars in the World Use

FLOAT-O

BECAUSE IT

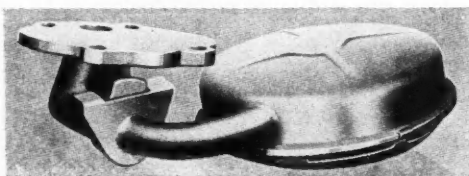
Supplies bearings with the "Cream" of the Oil—from the top of the Crank Case

The sludge, filings, and heavy abrasives which cause serious engine wear and inefficiency naturally precipitate to the bottom of the crank case. FLOAT-O installed at the pump intake, draws horizontally from the clean oil found at the top—it does not disturb the harmful substances found at the bottom of the crank case. With FLOAT-O only this "cream" of the oil sump is distributed to the bearings. This is true during starting and all running conditions. FLOAT-O is also a definite guarantee against ice locking.

Indorsed and approved by the leading research engineers of the industry, FLOAT-O insures quicker starting, smoother operation, and longer life for engines.

FOREIGN LICENSEE { BRITISH WIRE PRODUCTS LTD.
LONDON, ENGLAND

Write for Literature
TAYLOR SALES
ENGINEERING CO.
ELKHART INDIANA



C.O.E. Standard

The Bill for Military Inspection of Motor Vehicles, now under discussion in the Diet, calls for unification of truck models, especially in respect of body design, in accordance with defense requirements. It is expected that in future all Japanese-made motor trucks will be cab-over-engine models, which have found particular favor with the defense authorities. In fact, all Toyota and Nissan trucks supplied to the Army since the outbreak of the current hostilities were C.O.E.'s.

Under the projected law the defense headquarters may also repeal a ministerial decree of 1936, setting certain limitations on the maximum floor height and clearance of buses. The result of this decree was that the frame of truck chassis was also lowered, making them unsuitable for military use.

Ikegai Makes Fuel Pumps

The Ikegai Automobile Industry Co. has spent \$540,000 on equipment to produce fuel pumps for automotive Diesel engines.

Negotiations are reported pending between Japanese military authorities and representatives of the Robert-Bosch-A.G., Germany, with a view to obtaining for Japanese automotive manufacturers licenses on Bosch fuel injection equipment for Diesel engines.

Movable Headlamps

The Tanaka Iron Works has produced samples of a novel automobile headlamp unit invented by a Shizuoka insurance salesman. The unit is connected to the steering column so that on turning the headlights swing automatically into a parallel axis with the front wheels, affording full visibility in taking curves. The direction of the headlights may also be changed manually from the steering wheel, both laterally and vertically, to suppress glare in passing oncoming cars and for reconnoitering in peace and in war.

Parts to Morocco

Several automobile dealers from Morocco have recently visited Japan and let contracts for a substantial quantity of Japanese-made Chevrolet

parts, the *Nikkan Kogyo* reports. The paper expresses doubt, however, whether Japanese parts makers will be able to hold their own in view of the fast rising cost of raw material and labor. The sales to Morocco are said to have been made at a sacrifice.

Car Prices Up

Japanese branch plants of Ford and GM have revised list prices of cars and trucks in sympathy with higher quotations by local manufacturers.

Japan's lowest priced baby car, the "Datsun," now sells at Y2,550 (\$700), an increase of Y550 over 1937.

Absorbs Motor Firm

The Tachikawa Aircraft Co. has bought up the Highspeed Engine Industry Co., which once turned out "Ohta" small cars. Tachikawa is using the plant to produce aircraft parts. Highspeed Engine found it unprofitable to continue the production of baby cars because of the severe restrictions recently placed on raw materials for the construction of such cars.

Toyota 1939 Truck

The Toyota Automobile Co. has announced a new truck model, which has a wheelbase of 3909 mm and is powered with a straight six-cylinder gasoline engine whose cylinders have a bore of 84 mm and a stroke of 102 mm, making the total displacement 3390 cc. The engine is rated 75 hp. at 3000 r.p.m., operating at a compression ratio of 1 to 6. As in previous models, Toyota builds the engines with overhead valves. The transmission of the new truck provides four forward speeds and one reverse. The new truck is listed at Y5,200 (\$1,425).

New Swedish Plant For Trucks-Buses

Automobilfabriken Thule, Koping, Sweden, has announced that it has erected a new plant in Soderham (in Northern Sweden) where trucks and buses will be manufactured. According to the present plans, reported by the Department of Commerce, 100 truck and bus chassis will be produced in 1939. The chassis and various heavier parts are made by the company, while the engines and smaller parts are either imported or purchased locally.

The trucks are made in two models, the report stated. The lighter chassis, intended for a load of four tons, will be available in three wheelbases and powered with a 6-cylinder American gasoline engine. The larger truck chassis, of 5-6 tons, or the bus chassis for 40-50 passengers, is equipped with either gasoline or diesel type engine of American manufacture.

It was said to be the opinion of the trade that this make will have little influence on the sales of American trucks and buses in Sweden. However,

as the size of both the trucks and buses correspond to the Swedish "scania-Vabis," it may compete actively with this make.

Studebaker Observes Its Eighty-seventh Birthday

Without fanfare or special events, the Studebaker Corporation on Feb. 16 celebrated its eighty-seventh birthday. Paul G. Hoffman, president of the corporation, in a statement to a party for fathers and sons employed by the company, said that the average length of employment of men now on the payroll

is 11.06 years and that the present force of Studebaker workmen represents 72,652 years of service.

The firm was established Feb. 16, 1852 by Henry and Clem Studebaker under the name of H. & C. Studebaker, Blacksmiths and Wagon Builders. Henry, aged 26, and Clem 21, started with a capital of \$68 and two forges. Studebaker now is a \$30,000,000 company owned by 25,021 stockholders and employs 6760 while its 2595 dealers employ 13,235. The company built its first "horseless carriage" in 1902 and in 1904 production of gasoline motor cars began on a volume basis.

"These Drill Presses are Giving Me an Edge"



Manufacturers tell us that Delta Low-Cost Drill Presses give them a distinct edge on their competitors. Here's why: Delta Drill Presses cut labor costs, increase flexibility, save on special set-ups. They give you durable precision machines at a fraction of the cost of heavy machines. For instance: The unit here illustrated gives you

MANY SPECIAL FEATURES

Five speeds: 385, 600, 935, 1450, 2240 R.P.M. Floating Drive: Preloaded double-seal ball bearings: 16 tooth splined spindle: Table-Raising gear: Head-raising gear: Tilting or production table: Completely enclosed belt: Safety spring wind: Foot power feed. Overall dimensions 66" high; 18" wide; 27" front to rear. Tilting table 11" by 12". Production table 12½" by 17" surface. Floor base 10" by 13¾" table surface. Shipping weight 340 lbs. Separate drill press heads available. Also high speed bench models and 2 spindle models.

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Gentlemen: Please send me the new 1939 Catalog.
Name
Address
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Golden Gate Exposition

(Continued from page 254)

wool and mohair. About the walls are dioramas showing the source of some of these materials such as iron, coal, zinc, aluminum, cotton and soybeans, the principal manufacturing operations on each and a representation of the parts of a complete car formed by each.

Off the entrance horseshoe is the main exhibit hall where there is a wide display of manufacturing processes, inspection and testing exhibits, includ-

ing the Ford-built Johansson gages, a revolving chassis, an operating model of the by-products section of the Ford Rouge plant at Dearborn, Mich., a model service station and a demonstration of motor assembly are on exhibit.

A part of the display is an exhibit sponsored by the Champion Spark Plug Co. showing the manufacturing processes of its product. Also in the main exhibit hall is the Firestone Tire and Rubber Co.'s exhibit which produces

small, all-rubber miniature Ford V-8 cars. The major steps in the manufacture of rubber products is shown.

In a darkened room just off the main hall there are demonstrations of the stroboscope which enables engineers to study a speeding engine by arresting its motion. The weatherometer and the fadeometer, used for testing weather and sunfast qualities of upholstery and finishes, are demonstrated. The dark room also shows a popular representation of the fourth dimension and an exhibit showing the fallacies of the theories of perpetual motion.

Chrysler Corp. has an extensive display exhibiting the company's complete line of passenger cars including Dodge, DeSoto and Chrysler; its Plymouth and Dodge commercial cars; its Dodge trucks and also the Airtemp, air-conditioning and heating equipment.

Occupying the greatest amount of space of any single exhibitor in the Vacationland Building is the General Motors "Progress on Parade" exhibit under the management of David P. Harr.

The exhibit can be located from nearly every section of the building by its outstanding twin pylons which tower 50 ft. in height from the center of the exhibit area. The base of one of the pylons houses a "Hall of Science" consisting of a specially constructed stage with complete theatrical effects. The entire modernistic enclosure structure, colorful with Lumiline lighting, displays a color scheme of Imperial Dragon Red and the Sun of Dawn Yellow. The exhibit area is enclosed by a low garden wall with impressive entrances on two sides and at the four corners.

The romantic saga of progress in American automotive industry, and the contributions its great research laboratories have made is the idea back of the General Motors exhibit. This display was conceived and built under the direction of Charles F. Kettering and designed to take its audience behind a modern research laboratory. This display is under direction of Robert Strauss of the General Motors Parade of Progress Caravan, a mobile circus of science that has been visited by millions of persons in the United States, Canada and Mexico.

Outstanding feature of this exhibit is what happens inside the cylinder of a gasoline engine, demonstrated by means of a transparent engine constructed of the simplest parts. The mysteries of internal combustion are revealed by this demonstration.

In addition to the elaborate research show of continuous performances, "Progress on Parade" includes a display of Chevrolet, Pontiac, Oldsmobile, Buick, Cadillac and LaSalle cars, with an exhibit of the various General Motors truck lines.

A Diesel engine and generator exhibit weighing 42,000 lb. and similar to the engines which power the railroad streamliners complete the General Motors exhibit.



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● The 1939 Spicer "Needle Bearing" universal joint has the traditional high load capacity, low friction, low operating temperatures and high efficiency in which Spicer joints have been outstanding.

The proved design insures satisfactory performance. The importance of RELIABILITY is recognized by engineers of leading automotive manufacturers who specify the Spicer universal joint.

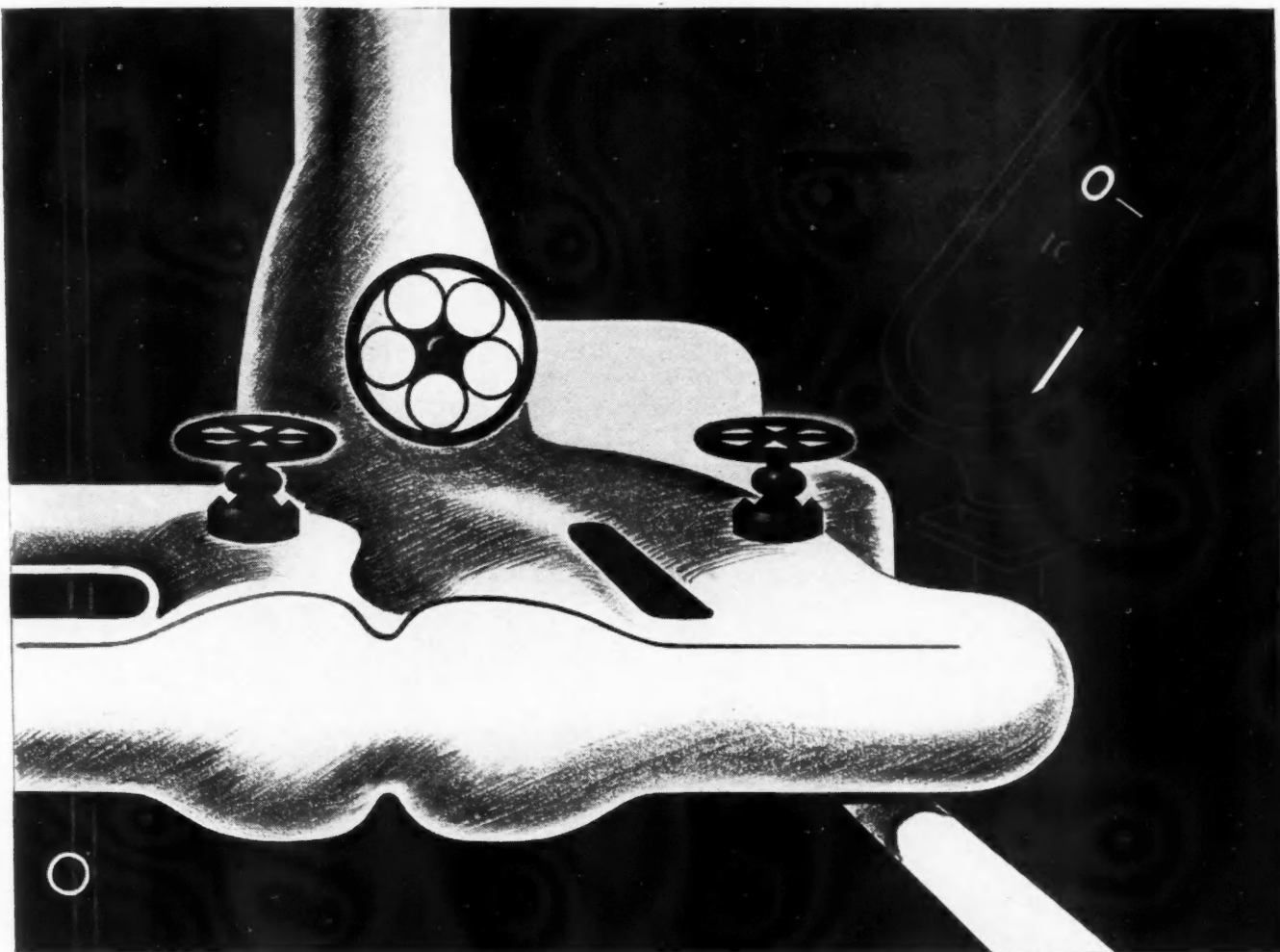
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A manufacturer of a large line of valves for operation at sub-zero temperatures required a steel having good impact properties at temperatures down to 150 degrees below zero F. Many different parts were involved.

Chrome-Molybdenum (SAE 4140) steel is standard in this case because of its established ability to

meet strict low temperature impact specifications.

In addition this Chrome-Moly steel is keeping material and production costs within competitive limits. It is yielding the additional profit that always comes from standardization. Substantial fabrication economies are also being obtained.

Our technical books "Molybdenum in Steel" and "Molybdenum in Cast Iron" which contain a great deal of practical data are free to any interested production executive or engineer on request.

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Books

La Tecnica del Disegno delle Macchine (The Technique of Machine Design), by Dr-Ing. Mario Tessarotto. Published by Ulrico Hoepli, Milan.

This is elementary work on machine design intended for use as a text in technical and industrial schools. It deals with drafting-room conventions, materials of construction and their properties, metal-working processes, sketching and mechanical drawing, standards relating to machine elements,

and the strength of joints (or connections) and of shafts. In the last two chapters, methods of calculating strength are explained and illustrated by examples. Most of the examples of machine parts illustrated are taken from the automotive and aircraft fields. In an Introduction by Giuseppe Belluzzo it is pointed out that the bases of modern design are quite different from those of the past century; speeds and pressures have increased greatly, and to the ordinary static stresses have been added stresses due to vibration and fatigue. On the other hand, high-strength materials have been introduced, the high strength being due to

alloying and to heat treatment. All these changes created a demand for a small volume on the principles of modern design, and the volume under review is offered to meet it.

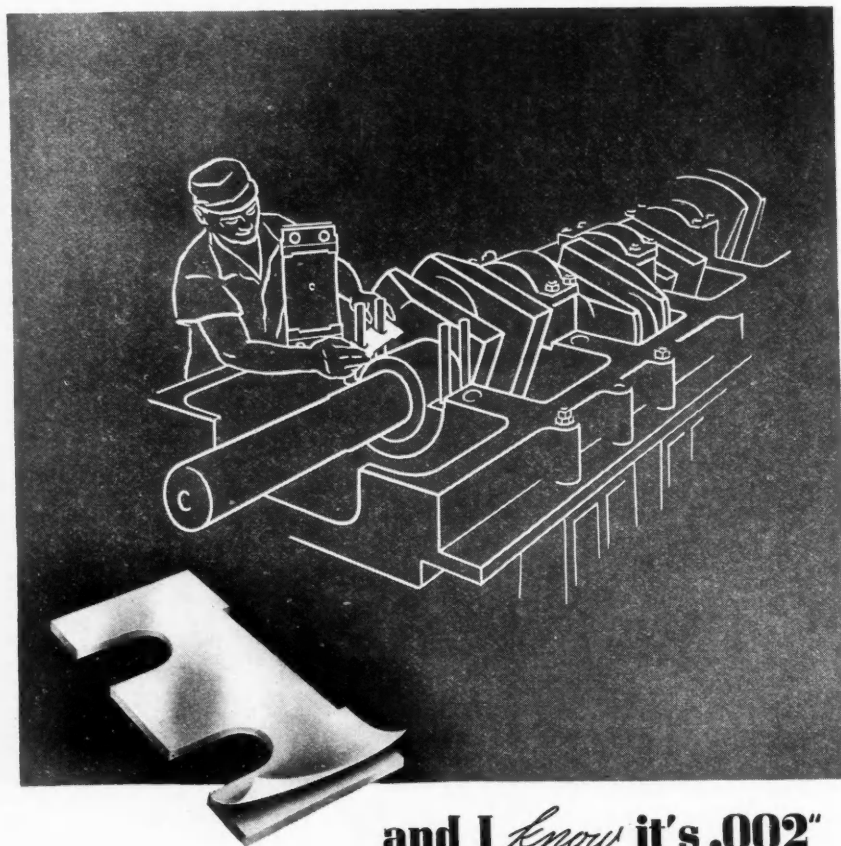
Patent Tactics and Law—What the Industrial Executive and Engineer Should Know About Patents, by Roger Sherman Hoar. Published by the Ronald Press Company, New York.

This book, which is a new edition of an earlier volume that appeared under the title "Patents," is intended to be a treatise on patent tactics and to translate into plain English so much of the patent law as will enable an industrial executive or engineer to understand the company's attorney when discussing a patent problem, and to cooperate fully with him. It is based on long experience in corporate patent practice and contains a great deal of information that should be helpful to executives whose firms are engaged in the manufacture of patented articles. Patent practice is covered in detail, not only as regards that of the U. S. but the practices of numerous other industrial countries as well. One chapter dealing with the organization of a patent department and another with the interpretation and validity of patents should be of particular interest to executives.

Diesel Engineering—by John W. Anderson, McGraw-Hill Book Co., 269 pp., \$3. This is the first edition of a book on the principles of Diesel engine design intended as a textbook for engineering colleges. Its author, as manager of engineering, Diesel engine division, American Locomotive Co., is in excellent position to develop the subject in well rounded fashion from the perspective of the latest available information on Diesel engine developments.

The text material places special emphasis on the principles of thermodynamics, on the mechanics of engine design, on the principles of installation, as may be noted from a listing of a chosen group of chapter headings, e. g., cycles, fuels, combustion, combustion chambers, fuel injection, cooling, lubrication, engine design, installation principles.

Valuable characteristic of this textbook, and one which should appeal to the student as well as the practicing engineer, is the reference to current engineering literature in many important sections. Not only does this treatment provide a background of authority but, what is of equal importance, it clothes the book with an up-to-dateness so essential in dealing with a subject still in a state of flux and practical development.



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Application Chart FREE
Write us for new file-folder illustrating the many types of bearings in which LAMINUM shims find application. For handy practical use. With it a sample of Laminum.

1146

Exit the Austin Seven, Enter the Austin Eight

After being for nearly 20 years the "best-seller" among the range of Austin cars, the Seven—referred to as

the "Baby Austin"—is to go out of production. It is being superseded by an entirely new model, to be known as the Eight.

The car closely resembles the Ford and Morris Eights in wheelbase and track and in piston displacement. It has conventional half-elliptic springs—again like the Ford and the Morris—but has a smaller piston displacement than the Standard Eight (900 cc against 1021 cc) which is distinctive among British cars of this type in having independent front suspension.

The new Austin also displaces the Big Seven introduced at the Earls Court show of 1937 to provide for roomier four-passenger bodywork.

Metal Markets

(Continued from page 252)

per cent, compared with 54.8 per cent in the preceding week, is nevertheless attributed to the gap in shipments to consumers occasioned by the holiday.

In the copper market there is more hope that a pick-up in foreign demand will bring about healthier conditions. At one time the export price dipped below 10 cents, but at the opening of this week's business it had recovered slightly, with some business booked at 10.10 cents. News from Washington that Congressional leaders had agreed to continue the present 4 per cent import tax also encouraged producers and custom smelters. They continue to quote spot electrolytic at 11¼ cents, but in the outside market metal was offered at 10.45 cents on Monday.

Spot Straits tin was offered at 45½ cents at the beginning of the week.

Following a \$2 per ton reduction in the price of lead, storage battery manufacturers came into the market, which after a spell of dullness, turned active.—W. C. H.

Publications

"Work Done on the Blanchard" is the title of an unusually interesting brochure brought out by the Blanchard Machine Co., Cambridge, Mass. Photographs and text are intelligently presented to illustrate and describe typical examples of the machining and finishing of flat surfaces by Blanchard grinding.*

The Tinius Olsen Testing Machine Co.'s newest machines for testing plastic materials are described in the company's bulletin No. 17.*

A new switchboard-model temperature indicator with self-contained toggle-type switches for connecting any one of a number of couples to the measuring circuit is described in a catalog issued by Leeds & Northrup Co.*

A folder published by Rinck-McIlwaine, Inc. describes a number of new Rimac tools.*

The South Bend Lathe Works has published a 32-page catalog announcing the new model 9-in. workshop precision lathe.*

Commemorating three decades of service to industry as originators and producers of industrial cleaning methods and materials, Oakite Products, Inc., New York, has pre-

pared a special issue of its house organ, **Oakite News**.*

E. F. Houghton & Co., Philadelphia, has issued a folder on the subject of transmission **leather belting**.*

"Nigrum" impregnated **hardwood bearings** are described in a leaflet issued by the Bound Brook Oil-Less Bearing Co., Bound Brook, N. J.*

Niagara Machine & Tool Works, Buffalo, N. Y., has prepared a new bulletin covering its series BL, 10-page **power squaring shears**.*

The Eclipse Air Brush Co., Inc., Pneumix division, Newark, N. J., has issued a data folder on the performance of its **air-motored agitators** in laboratories and industrial plants.*

National Labor Relations Board, division of Economic Research, has issued the fol-

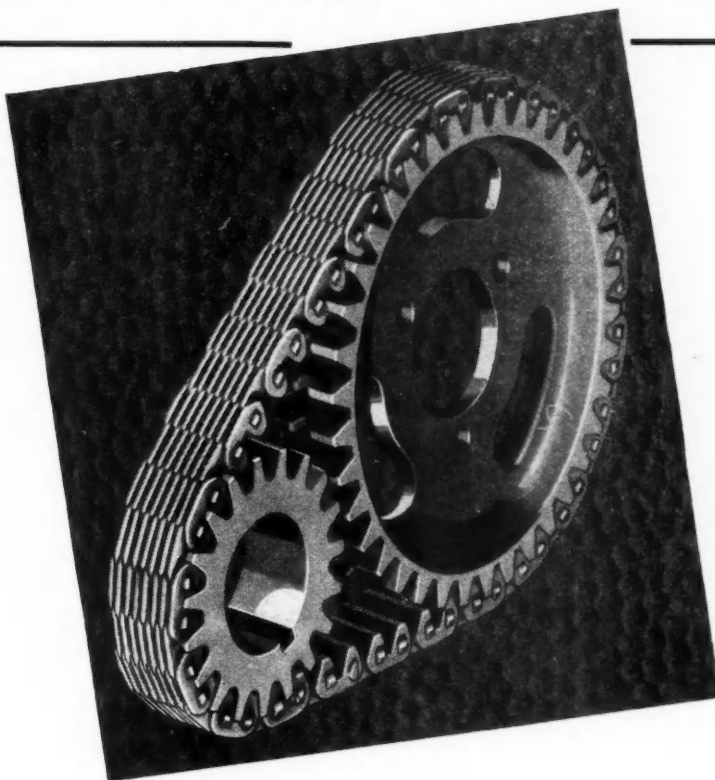
lowing pamphlets: "Union-Employer Responsibility" by Lyle Cooper; "Effective Collective Bargaining," by David J. Saposs and Lyle Cooper; and a "List of References on National Labor Relations Board" compiled by Bernard W. Stern.*

A picture book of ideas for handling various products mechanically on **overhead conveyors** has been published by Link-Belt Co., Chicago.*

The Harnischfeger Corp., has announced the completion of bulletin C-6 "**Industrial Cranes**," which covers completely the design and application of the line of P & H Industrial Cranes for general usage in industries the world over.*

* Obtainable from editorial department, AUTOMOTIVE INDUSTRIES. Address Chestnut and 56th Sts., Philadelphia.

...the result of carefully coordinated engineering study



IN all the years since Morse Silent Chain drives were first used, no other principle has been found that combines so many desirable performance features. This has been

accomplished through the work of leading motor car engineers, coordinated with our own engineering research.

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Tools of Tomorrow

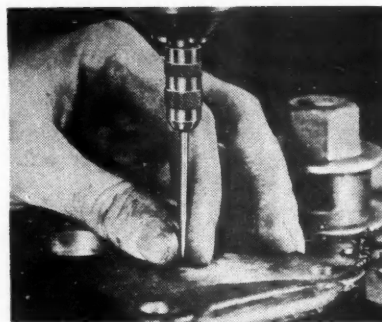
Center Finder

... For tool and jig work with various vertical machines

A handy and inexpensive tool has been developed by the L. S. Starrett Co., Athol, Mass., for jig and tool work in milling machines, drill presses and similar vertical machines where it is necessary to locate working points with considerable accuracy. It consists of

a spring-tensioned pointer held in a tapered shank with the pointer free to "wiggle."

With the center finder set in the chuck or tool holder of the machine and the pointer guided to true concentric, it is said to be a simple matter to bring the working point of any job into perfect alignment with the machine spindle. The tension of the spring which bears on a ball on the end of the pointer can be adjusted by a screw in the



Starrett center finder

back of the shank. This spring cushions the pointer and protects it against damage or distortion if the center finder is brought into too firm contact with the work. The pointer can be telescoped into the body when not in use.

A CYLINDER bore, even though it has a beautiful, lustrous surface, may still be unacceptable. It may also be slightly out of round, tapered or snaky. It may not be within required diameter tolerances, or it may have surface metal defects produced by preliminary machining or heat treating operations.

MICROFINISH is the one process that accomplishes final control of all these factors:

It corrects errors in roundness, straightness and taper.

It offers accurate control of bore diameter.

It provides a means for the removal of sufficient stock to eliminate surface metal defects.

It produces any degree of smoothness desired.

Write for complete details.

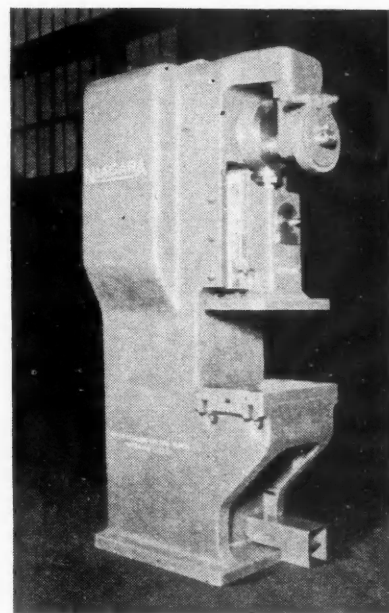


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February 25, 1939

When writing to advertisers please mention Automotive Industries

Automotive Industries



Newcomer to the series of presses built by the Niagara Machine & Tool Works, Buffalo, N. Y., is this stream-lined punch press. Gearing, clutch, flywheel, V-flat drive and motor are all enclosed within the frame

(Please turn to page 278 for other new product descriptions)

Chicago Motor Coach To Buy Diesel Buses

Authorization recently was given to the Chicago Motor Coach Co. by the Illinois Commerce Commission to spend \$640,531.50, for 50 Diesel-powered buses.

The operation of these buses is largely experimental and the company will be ordered to install gasoline engines in the new coaches if the Diesel-powered jobs are not satisfactory.

Commission engineers said the recent demonstration of a Diesel-powered bus showed less noise in operation compared to the gasoline-powered vehicles, complete absence of carbon monoxide gas, and smoother starting and stopping.

Today's Cars Are Longer Lived

(Continued from page 202)

As a check against actual existing conditions it is interesting to see just how closely this estimated cars-in-use compares with an actual count just completed by R. L. Polk & Co., as of July 1, 1938. The total at that time was 23,538,036 passenger cars which, we feel justified in comparing directly with our estimate as of Oct. 31, 1938, of 23,350,152, a difference of less than one per cent. We are making this direct comparison even though of slightly different periods because of the fact that all evidence points to the conclusion that all cars are being eliminated from use at about the same rate they are entering into service.

While some might not consider it to be statistically correct to assume that all makes of cars have the same life curve, we have taken the liberty of making that assumption and present in Table 4, below, our Estimate of Cars in Use by Makes as of Oct. 31, 1938.

Table 4—Estimated Cars in Use by Makes
(As of Oct. 31, 1938)

Make of Car	Number Surviving at End of Model Year
Auburn-Cord	76,019
Buick	1,172,240
Cadillac	95,998
Chevrolet	5,729,902
Chrysler-Maxwell	555,219
De Soto	302,639
Dodge	1,241,896
Durant	105,940
Ford	6,234,427
Franklin	24,865
Graham-Graham Paige	179,722
Hudson	249,359
Hupmobile	128,445
La Salle	109,052
Lincoln-Lincoln Zephyr	78,320
Nash-La Fayette	447,757
Oldsmobile	863,531
Packard	350,077
Pierce-Arrow	25,404
Plymouth	2,289,675
Pontiac-Oakland	1,139,466
Reo	57,494
Studebaker	512,777
Terraplane-Essex	620,952
Willys-Overland	507,785
Total These Makes	23,098,761
Miscellaneous	251,391
Total All Makes	23,350,152

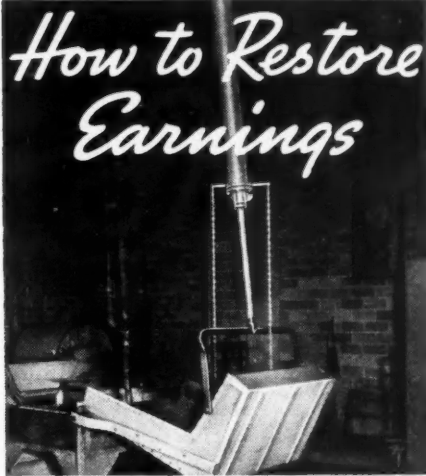
Here again it is of interest to check our computed registrations of cars by makes with the same official count as of July 1, 1938.

	Estimated Data	R. L. Polk Count	Percentage Difference
Buick	1,172,240	1,213,676	-3.4
Chevrolet	5,729,902	5,894,195	-2.6
Ford	6,234,427	6,568,436	-5.1
La Salle	109,052	105,330	+3.3
Plymouth	2,289,675	2,288,837	None

In a table on page 202, we present a picture of estimated cars in use as to make of car and year of manufacture. It is freely admitted that these data are subject to controversy, but at the same time we do maintain that

it is a fairly accurate picture of the situation at the end of the model year, at least accurate enough for any purpose to which it will be put.

On other pages in this issue will be found a count of total registrations of cars, trucks, and buses which for 1938 amounted to over 29,000,000 vehicles of which passenger cars constituted approximately 25,000,000 units. It is naturally somewhat confusing to mention an official count as of July 1, 1938, for passenger cars of 23,538,036 and then in



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Original cost, maintenance costs, depreciation are all lower with sturdy, simple Curtis Air Hoists than with other types of power hoists. And they provide smooth, dependable, accurate material handling which speeds up operations. All this adds up into profits.

Curtis Air Power Hoists show unusual stamina on the tough jobs. Ruggedly constructed with only one moving part, they operate for many years with a

minimum of attention. They are not subject to injury from overloads or bad atmospheric conditions.

Examine your plant for applications of Curtis Air Power Hoists—it's an important opportunity to add to profits by cutting lifting expense.

For suggestions and useful data on Air Power, send the coupon below for our booklet, "How Air is Being Used in Your Industry."

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another location a count of 25,000,000 cars. In the count of 25 million passenger cars there are innumerable duplications which it is impossible to delete. There are also other vehicles included with passenger cars which are not cars. For instance, California includes over 130,000 light commercial vehicles with passenger cars. Many other states follow the same procedure. Buses are included in the passenger car count in many states as are also hearses, funeral cars, etc. Numerous duplications are found in non-resident registrations and also in transfers. The

State of Massachusetts, for example, has 155,000 transfers, which fortunately we are able to delete from their total registrations. However, in many states these cannot be eliminated in those cases where they should be.

The count as of July 1, 1938, is an actual count of each registration card in the office of the motor vehicle commissioner. By this method practically all duplications or incorrect registrations are eliminated and we feel that the resulting count is a much more accurate picture of the true number of cars in use.

Process for Treating Aluminum Pistons

THE process of treating aluminum pistons, after anodizing, with Aquedag, a suspension of colloidal graphite in water, has been patented in England by Aluminum Colors, Inc. The machined pistons are first anodized by suspending them in an electrolyte containing 20 per cent sulfuric and 5 per cent oxalic acid. With the pistons acting as anode, current at 14 volts is sent through the bath for 30 minutes, at a current density of 13 amperes per sq. ft. Aquedag diluted with six times its volume of water is then applied to the anodized surfaces with a brush. After the coating has dried it is said to be hard to remove, and it evidently has good lubricating and anti-scoring properties.

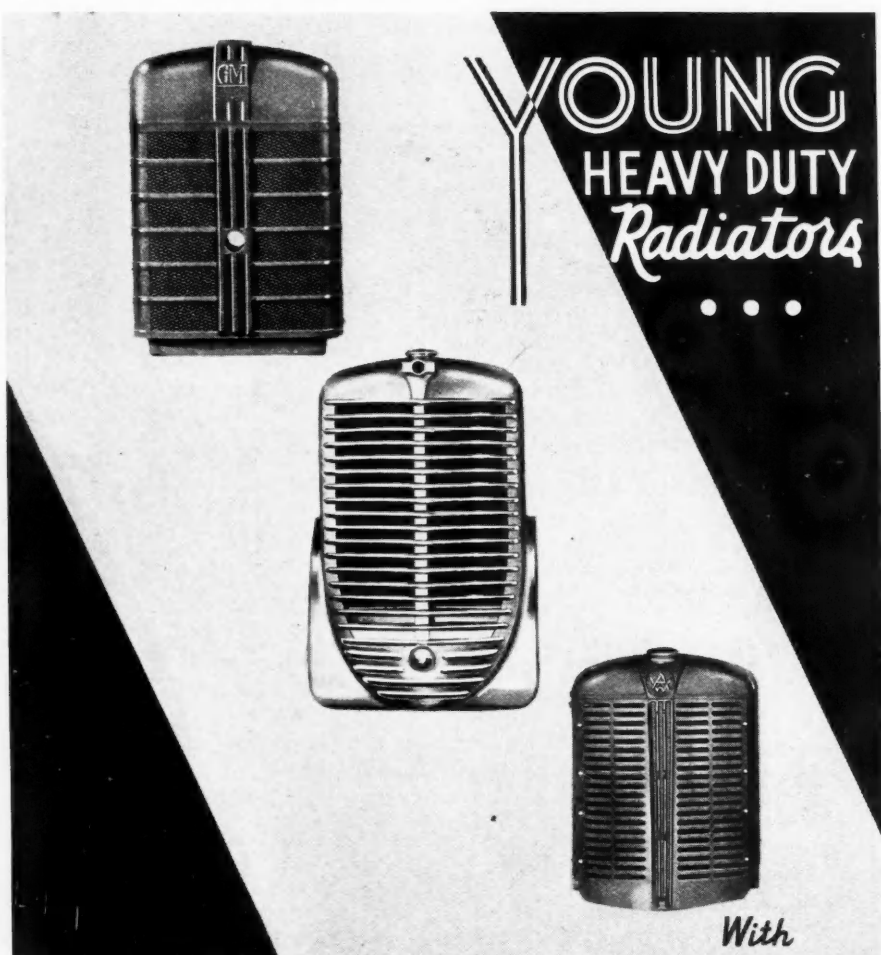
Endurance Limit Under Torsion of Shafts

ACCORDING to German investigations, the endurance limit under torsion of shafts with radial drill holes (oil holes) can be materially increased by cold-working the material around the outer end of the drill hole by means of a punch. Optimum results were obtained with a punch having the form of a square pyramid with well-rounded corners, the punch being introduced into the hole with two of its sides parallel with the axis of the shaft. Tests were made on shafts of 60 mm. (2-11/16-in.) diameter, and it was found that by cold working of the edge of the drill hole the endurance limits of shafts of two heat-treated steels could be increased by from 28 to 63 per cent.—ATZ, Dec. 25.

SAE Cutting Fluid Committee Meets

A meeting of the Independent Research Committee on Cutting Fluids was held in Detroit recently. Arrangements were made to start a new research project which will classify machining operations and coordinate this with the machinability rating of commonly used ferrous and non-ferrous materials. It is expected that this classification will permit a better approach to the selection of cutting fluids for specific operating conditions.

The committee reports that its recent survey of cutting fluid recommendations for non-ferrous materials indicates that there is a dearth of publicity information on this subject. It is expected that the new project will provide specific recommendations for the machining of non-ferrous material.



For Cooling Diesel or Gasoline Engines


THE trend toward streamlining has entered the field of heavy duty industrial equipment. In addition to ruggedness and efficiency radiators for this equipment must have lines blending into a composite pleasing appearance. Young Engineers have been prominent in the development of many of these units and can also take care of your problem. Place your specifications before us.

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"H_as a uniform normalized condition"

"E_minently superior to alloy castings or welded tubes"

"L_engthens life of finished parts"

"B_oth in production and performance, very successful"

"Y_our tubing always meets our specifications"

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**SHELBY SEAMLESS
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NOWHERE can you find better proof of SHELBY's quality than in the experiences of automotive parts makers who are now using it in their production. These men require tubing that is strong, easy to machine and fabricate, free from inclusions or hard spots, dimensionally accurate, and above all, thoroughly uniform from end to end.

SHELBY meets these requirements with consistent regularity. That's

why, every year, millions of feet of this top-quality tubing go into axles, housings, drag links, tie rods, steering columns, torque tubes, shock absorbers, and other vital parts.

When you need tubing, call the SHELBY Distributor. Because of the increasing demand for SHELBY, he is now carrying larger stocks than ever, ready to give you exactly the kind of service you need.

Write for complete information.

NATIONAL TUBE COMPANY

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UNITED STATES STEEL

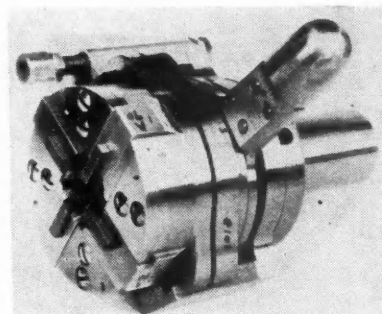
Insert Chaser Die Head

... New style for use on hand screw machines and turret lathes

A new style of H & G insert chaser die head for use on hand screw machines and turret lathes has been developed by the Eastern Machine Screw Corp., New Haven, Conn. The head uses the same insert chasers as other styles and is made in what is known as 101, 102 and 103 sizes, the latter size having a range from ¼-in. up to 1¼-in. long threads and up to 1½-in. di-

ameter in short threads. All three sizes of heads use the same chasers where the sizes are within their rated capacities.

The drive is by torque arms located a maximum distance from the center. The head may be tripped either by pull-off or by front end contact, the latter being especially desirable for close to shoulder threading or for cutting extremely short threads. Fine adjustment for length of thread is self-contained on the head itself. The shank of this head is detachable and can be furnished in any reasonable diameter. There is a clearance hole through the



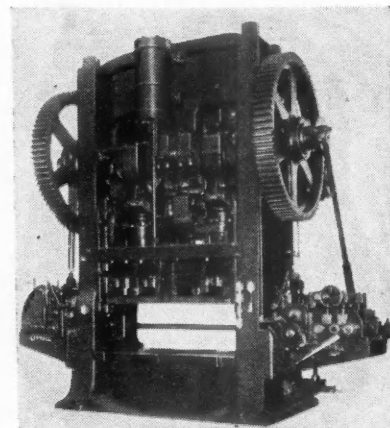
H & G insert chaser die head

shank making it possible to cut any length of thread in diameters up to the die head's normal capacity.

Lighting Unit

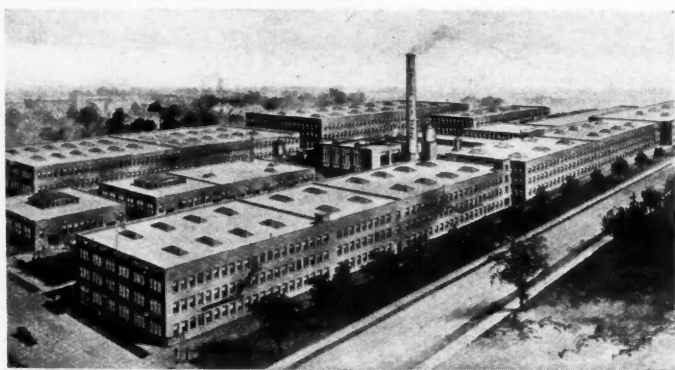
... For industrial operations which require accurate discriminations of color

The Benjamin Electric Mfg. Co., Des Plaines, Ill., has brought out a new lighting unit for industrial operations which require accurate discrimination of color for matching, grading, and sorting. Known as the "Daylight" fluorescent lamp diffuser, the unit provides a minimum of 100 footcandles of daylight quality light of 6500 deg. Kelvin color temperature rating which can be uniformly distributed over an area 3 ft. by 4 ft. when a 36-in. lamp is suspended 30 to 36 in. above the surface; a proportionally lower intensity over a relatively smaller area is provided by an 18-in. lamp. Among many applications, the unit is recommended for color inspection in dipping,



Difficulties encountered by one large automobile manufacturer in handling wide sheet stock have been overcome by the installation of six roll feed units built by the F. J. Littell Machine Co., Chicago. The roll feeds have a capacity for stock 5/32 in. thick by 24 in. wide and are mounted on 900-ton straight-sided presses, as illustrated above. The speed of these presses is 15 cycles per minute with a 28-in. length of feed. Feed rolls measure 8.6 in. in diameter by 26 in. in width.

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Principal Cities
Established 1899

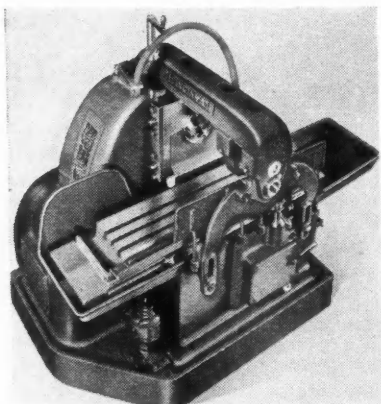
spraying, rubbing and finishing operations in paint shops of automobile plants; also for inspection for color and quality of plastic materials.

Milling Machines

... Of fixed bed type with table travel of 18 in. or 24 in.

The new No. 2-18 and No. 2-24 plain automatic milling machines announced recently by The Cincinnati Milling Machine Co., Cincinnati, Ohio, are of the fixed bed type and available with a table travel of 18 in. or 24 in. The new machines are particularly adaptable for the manufacture of medium size automotive and aircraft parts.

The machines feature 20 spindle speeds, ranging from 30 to 1200 r.p.m., and 16 feeds from 1 in. to 40 in. per minute. To further adapt the ma-



Cincinnati Milling Machine

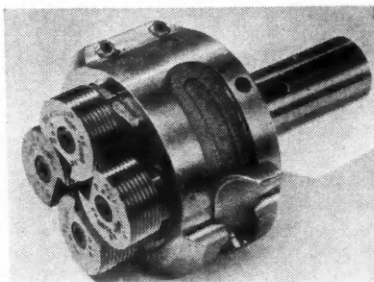
chines to high production milling, an automatic spindle stop; a hydraulic backlash eliminator; dog-controlled, automatic working cycles for the table with intermittent feed are provided.

Die Head

... With adjustable compensating float which "cushions" chasers on to work

The National Acme Co., Cleveland, Die Division, has a newly designed die head for Brown & Sharpe automatics. This head is built in sizes $\frac{1}{4}$ in., $\frac{3}{8}$ in., and $\frac{9}{16}$ in. capacities and uses the standard or special ground thread circular type of chasers.

Among the new features of head construction is an adjustable compensating float which "cushions" the chasers on to the work, preventing torn or distorted threads at high spindle speeds. Two methods of closing the die are provided: either held closed under tension while the turret indexes; or closed in the last position just prior to threading by a simple stop arranged to arrest the forward travel of the die slide. Selection of the closing method may be made to accommodate the number of other tools used and to insure positive performance under fast indexing of the machine turret.



National Acme die head

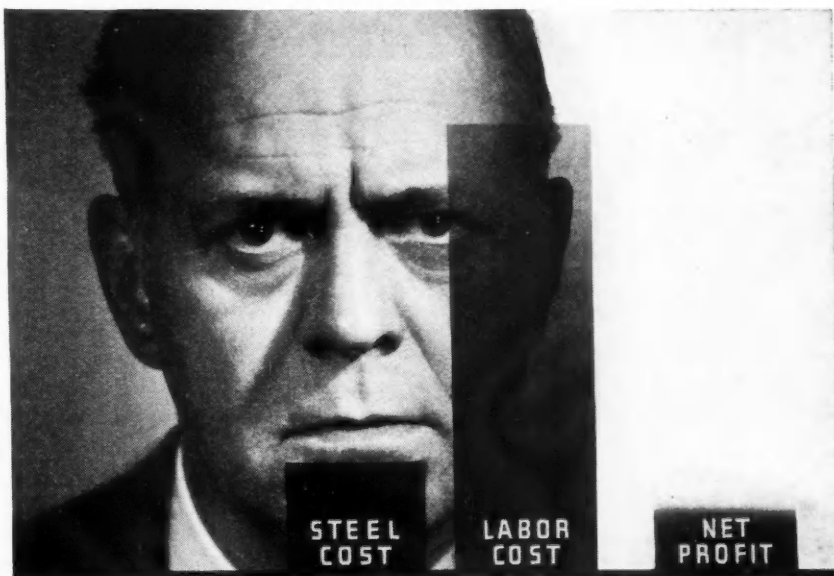
Quick adjustment to diametric cutting size is by means of only two screws

which move all the circular chasers (with holding blocks intact) uniformly and at the same time.

Circular chasers mounted on blocks are removed for resharpening by loosening one screw, and by the use of a sizing micrometer fixture. When returned to the head the cutting size is not changed, therefore no adjustment is necessary after grinding. The circular chasers provide for 270 deg. of grind on circumference.

Chasers can be changed to hollow milling and forming tools simply by substitution of cutters and holding blocks.

(Next page, please)



Consider Labor Costs When Buying Steel

On most jobs, shop labor costs are the biggest single factor—and they depend to a large degree on the steel used. If bars are too hard for bending or forming—or have hard spots to break or dull tools—if some shapes are not straight—or if in the case of alloy steel the required properties are not developed by the first heat treatment—then up go costs, down go profits.

Purchasing steel that is uniform and has the properties most desirable for your particular use often pays big dividends in the form of decreased shop costs. You do not have to pay any more for this kind of steel—so why not get it?

For several years Ryerson has been building up stocks of these better, more uniform steels. Careful selection, checking, testing, and inspecting assure the uniform high quality necessary for Ryerson Certification. Try Ryerson Certified Steels on your hardest job—and check the labor costs. Many have told us that it pays.

JOSEPH T. RYERSON & SON, Inc. Plants at: Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.

RYERSON
Certified
STEELS



Optical Inspection

... Comparator and measuring machine has a 30-in. diameter screen

The Jones & Lamson Machine Co., Springfield, Vt., has announced a new model of its comparator and measuring machine, which has a 30 in. diameter screen. Typical parts for which the machine is suited are, large form tools, cutters, hobs, taps and gages, as well as products. The following lenses can be furnished:

20X lens which will project a 1½ in. area object.

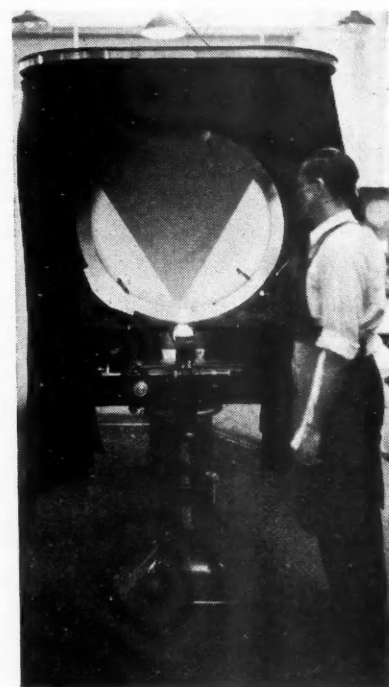
30X lens which will project a 1 in. area object.

50X lens which will project a 0.6 in. area object.

100X lens which will project a 0.3 in. area object.

The periphery of the 35 in. diameter ring, which supports the screen, is graduated to one-half degrees, reading with the vernier to one minute of arc. This machine will accommodate objects 8 in. in diameter by 21 in. long and has provisions for measuring 4 in. on the coordinates.

The machine is furnished with any one of three types of table; plain table without lateral adjustment, table with

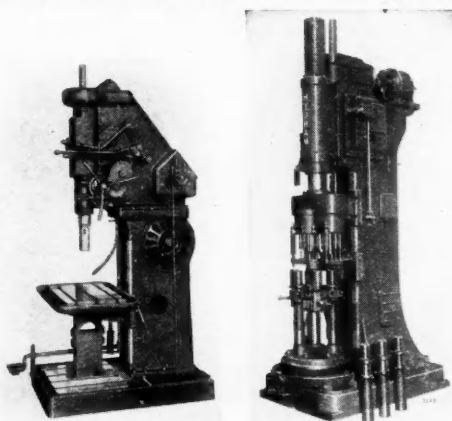


Jones & Lamson comparator and measuring machine

4 in. lateral travel, and table with 8 in. lateral travel. The table may be swiveled to position the helix of hobs and taps normal to the axis of the lens system.

Lead measurements on the tables with lateral travel may be accomplished by the use of the micrometer attached to the table, by spacing blocks or end measuring bars.

DRILLERS - - - HONERS To Increase Production and Profits

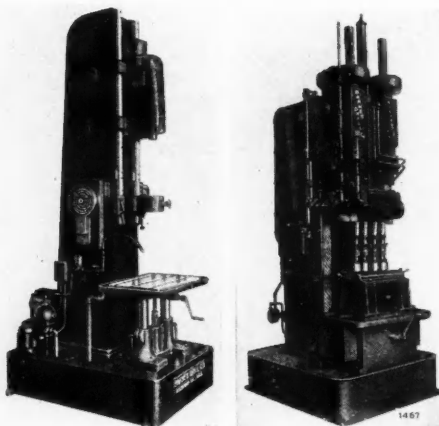
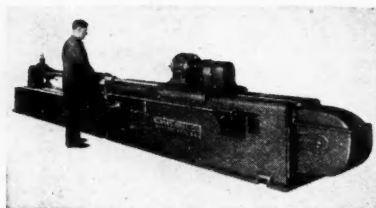


As long-established manufacturers of Self-Oiling, All-Gear Drilling Machines and Hydraulic Honing Machines, we can provide standard or special equipment for a wide variety of drilling, boring, reaming, tapping and similar operations; and any honing whatever. Descriptions, specifications, and prices of our standard machines will be sent promptly on request. Write for catalog E. The cooperation of our engineering department is available without charge for developing new applications of our products.

Drilling—Above at left is shown a typical Self-Oiling, All-Gear Drilling Machine with quick-change speeds and feeds. A wide variety of sizes and types, some with pick-off gears, are available. Hydram Drilling Machines are big and powerful, have automatic operating cycle including stepless hydraulic feed directly over center of cutting tools. Shown above at right is a Hydram with special multiple-spindle head and rotating fixture. High Production Units in practically unlimited variety, number of spindles and applications incorporating Self-Oiling, All-Gear Drilling Machines and Hydrams are designed to meet special requirements.



Honing—Self-Oiling Hydraulic Honing Machines are accurate, fast, economical; have exclusive advantages. Illustrated directly at right is our new No. 194 single-spindle Honing Machine. Some smaller, and many larger sizes available. At far right is shown a Multiple-Spindle Honer. These also are built in various types. For honing work too long to handle vertically, Horizontal Honers are available in a number of sizes, one of which is shown below. Write today for complete Honer information.



BARNES DRILL CO. 817-847 CHESTNUT STREET
ROCKFORD, ILLINOIS, U.S.A.

Electric Butt Welder

... For saw blades from 1/16-in. width up to 1/2-in. width.

Grob Brothers, Grafton, Wis., manufacturers of die making machines, has developed and added to its line an electric butt welder for saw blades from



Grob electric butt welder

1/16 in. width up to 1/2 in. width.

The saw blade clamps are of an entirely new design to permit positive and accurate line-up of the saw blade, and full electrical contact. The saw guides are adjusted so the teeth of the saw blades are outside of the clamp, only the flat part of the blade is in the clamp. The clamps are provided with an eccentric connected with a small lever, and the clamps automatically adjust themselves to various thicknesses of the saw blades. Saw blades are firmly held during the welding and annealing operation.

After the saw blade has been welded and annealed, it is removed from the clamps ready for grinding. The grinder quickly removes the welding flash. The grinder is a built-in unit with a high grade ball bearing motor with grinding wheel guarded. A Bakelite wheel is used, as other wheels will not endure the high speed of the motor.

The overall dimensions are 12 in. high, 8 in. wide and 8 1/4 in. deep. Shipping weight per unit is 58 lb.

Hoist

... *Lightweight wire rope electric unit added to Wright Mfg. line*

The Speedway, a lightweight low-cost wire rope electric hoist, has been added to the present line of this equipment made by the Wright Mfg. division of the American Chain & Cable Co., Inc., York, Pa.

Hoisting capacities range from 250 lb. to 750 lb. and hoisting speeds 15 ft. to 45 ft. per min. The construction includes fully enclosed ball bearing motor, anti-friction bearings, cut alloy steel spur gears, multiple disc solenoid brake, push button control, and pre-formed hoisting cable.

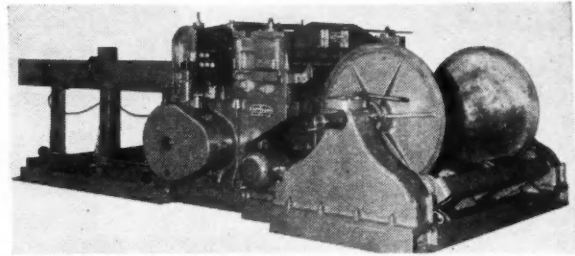
Cut-to-Length Shear

... *Capacity to handle from 24-in. to 78-in. wide stock*

Illustration herewith is a Cleveland automatic cut-to-length shear arranged with uncoiler, five roll leveler and feed rolls. The shear, which has capacity to handle from 24 in. to 78 in. wide stock, is equipped with a discharge table located back of the shear, which holds the sheet in position until the cut is made at which time the discharge is automatically tripped and the sheet drops into a buggy which is placed in the stacker. The shear is the down cut type, the eccentric shaft by which the shear is operated being located below the bed and so designed that the connections pull down on the slide. The shear is arranged for a speed of 60 strokes per minute while the feed is arranged for a speed of 200 ft. per minute. The number of cuts which can be made per minute is, of course, determined by the length of the feed.

The stacker unit, or run-out table, is adjustable to accommodate sheets

Cleveland cut-to-length shear



24 in. to 78 in. in width and is arranged for a feed of 6 in. minimum to 120 in. maximum, although the length of feed can be increased by extending the stacker guides on which the timer is mounted. The heavy duty uncoiler is

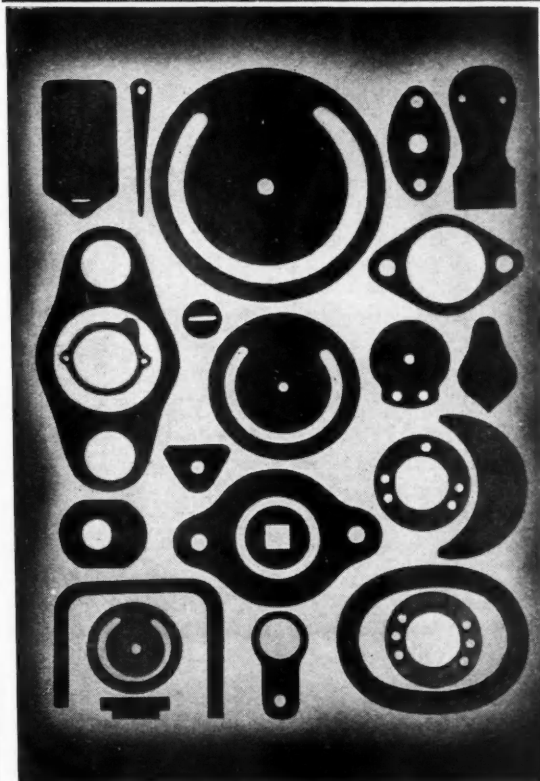
of the cradle type and so designed that as the coil decreases in size, all rollers continue to bear on the outside of the coil, the rollers being covered to prevent marring the material.

(Next page, please)



Hydraulic Packings and MECHANICAL LEATHERS

NOTHING TAKES THE PLACE OF *Leather*



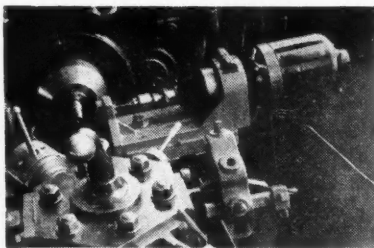
Send Us Specifications or Samples for Prices!

EXCELSIOR LEATHER WASHER MFG. CO.
ROCKFORD, ILLINOIS

Drilling Unit

... Adapted to use on screw machines and turret lathes

The Hole Engineering Service, Detroit, is manufacturing a compact, self-contained unit adapted to use on screw machines and turret lathes for drilling cotterpin or cross holes in studs and similar work. It incorporates a Govro-Nelson automatic drilling unit, which employs the principle of centrifugal force for feed pressure. The unit is mounted in a special bracket, which includes a bushing support in combination with a V-block stop.



Hole drilling unit

With this device, the cross holes are drilled in the studs before they are threaded, thus eliminating burrs and a burring operation on both the hole and

the thread. With suitable riser block the assembly can be mounted on the screw machine cross slide in line with the machine spindle, so that the V-block bushing support may be brought in contact with the work after the machine spindle is stopped. When the operator presses a push button switch, the unit feeds the drill through the work and automatically returns it to the starting position.

Blower Wheels

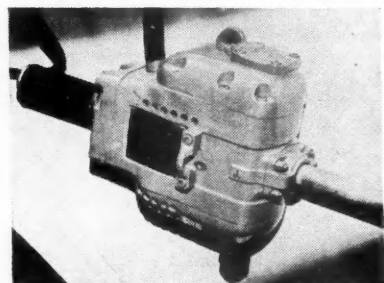
... Double inlet type made without rivets from pressed steel.

Designed for warm air furnace blowers and similar applications, a new line of double inlet blower wheels made without rivets from pressed steel has been announced by the Torrington Mfg. Co., Torrington, Conn. The "Airotor" line of blower wheels is available in 12-in. and 16-in. diameter sizes. A third size, 20-in. diameter will soon be added.

Nut Runner

... Hicycle tool styled by Designers for Industry, Inc.

A hicycle nut runner styled by Lawrence Blazey of Designers for Industry, Inc., Cleveland, for the Chicago Pneumatic Tool Co., is made of cast



Hicycle nut runner

aluminum and incorporates steel inserts for bearing faces of moving parts.

Features lie in the design of the chuck end for clearance in tight corners, designing the handle bracket in malleable iron for attachment to the casing, and tying the component parts of the tool together by means of the recessed panel running around the casing.

Industrial Heater

... Dravo introduces suspended type gas-fired unit

Dravo Corp., Pittsburgh, Pa., has introduced a new high capacity suspended type unit heater designed for use in large industrial buildings where high velocity heated air is desired to heat rooms of large floor area and high ceilings.

Identified by the name LEE sus-

NOTHING TO THROW AWAY

But the Used Filtering Material

★★★★

Container Is Not Discarded



REDUCE YOUR COSTS — AND KEEP YOUR OIL CLEAN LONGER

With the *MICHIANA* re-packable filtering element—there is no need for complete replacement—you can save this expense—because only the dirty filtering material is discarded.

NOW ADAPTED TO OTHER MAKES OF REPLACEABLE ELEMENT FILTERS

In answer to requests of bus, truck and fleet owners, *MICHIANA* has now made its Re-Packable Element adaptable to filters of other makes—giving them the low cost repacking feature heretofore available only with *MICHIANA* Filters.

Ask for descriptive literature

MICHIANA PRODUCTS CORPORATION,

Michigan City, Indiana

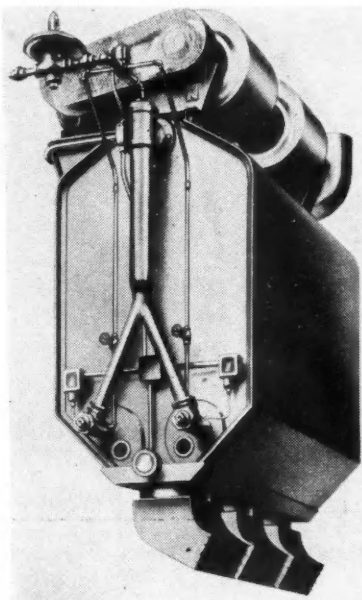
MICHIANA

Duo-Flo

DEPTH TYPE FILTERS

Ask for Booklet 337-A





Dravo industrial heater

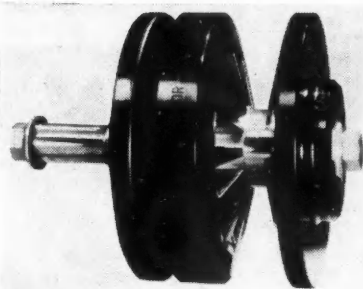
pended type unit heater, this gas-fired unit will operate on natural gas, manufactured gas, or coke oven gas. It is 3 ft. wide, 5 ft. long and 7 ft. high, weighs 3000 lb. and is of welded steel construction throughout. It has an output capacity of 500,000 b.t.u. per hr. The air discharge is 5500 c.f.m. with an average temperature rise of 110 deg. Fahr. and correspondingly high outlet temperatures. Air velocity at heater outlets is 2000 f.p.m. Two blower type fans are used to spread the air.

Variable Speed Pulleys

... Made of solid high impact strength Bakelite

Continental Machine Specialties of Minneapolis, has improved its "Speedmaster" variable speed pulleys. These pulleys are moulded of solid high impact strength Bakelite, accurately trued and balanced before final assembly. An improved pressure lubricated bronze sleeve allows the splined center sheave member to operate freely, regardless of load or speed.

The new construction is available in two sizes, a 3½ in. diameter size for drives up to ½ hp. capacity and a 6½ in. diameter size for drives up to 3 hp. capacity. The pulley is said to be very flexible in its adaptability to both



Continental "Speedmaster" pulley

"straight line" and "angular" drives.

Advantages claimed by the manufacturer for the improved Speedmaster are: a six-to-one up to a forty-to-one ratio of infinitely variable speed, the use of standard "V" belts, and long belt and pulley life because of the moulded plastic work faces.

Punch Press

... Production increased by slowing down speed of machine

It sounds paradoxical that the number of blanks produced from a power

driven punch press could be increased by slowing down the rate of speed at which the press was operated. Yet, such an increase in production has been accomplished—and by this means—at The Reliance Electric & Engineering Co.'s Cleveland plant.

As originally installed, an 1800 r.p.m. ac induction motor had been belted to the flywheel of the punch press. This, in turn, was caught by a clutch having a maximum catching time of ½ revolution of the flywheel. Since the operator punched as many as 5 to 6 blanks from one strip of material he lost considerable time waiting for the flywheel to (Next page, please)

A RECENT INDEPENDENT SURVEY ASKED:

"Based on your own experience in cutting oils, which companies would you recommend?"

RESULTS:

Houghton, 2 to 1

OVER THE SECOND CHOICE

CUT-MAX

An all-inclusive series of straight cutting oils and bases, embodying the latest developments in sulphurized and E. P. treated products for every cutting need.

CUT-MAX Base No. 7, containing an 18% minimum of superactive sulphur—combined in a colloidal state—is absolutely unequalled in refrigerating and cutting efficiency. We will prove this in your plant.

Further, Houghton was given three times as many "firsts" as any other supplier of cutting coolants. Quality, reliability, product performance over fifty years, have built this leadership.

Today Houghton still leads because of the proven ability of its cutting oils to provide finer finish, higher surface speed and longer tool life. Write for illustrated leaflets describing CUT-MAX Straight Oils and Bases, and the "60" Series of Soluble Cutting Oils.

E. F. HOUGHTON & CO.
240 W. SOMERSET STREET
Chicago - PHILADELPHIA - Detroit

THE HOUGHTON LINE
OF STRAIGHT AND SOLUBLE CUTTING OILS

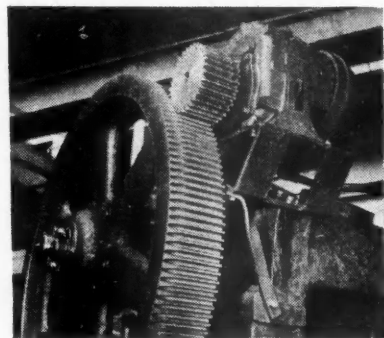
catch after he had pressed the foot pedal to engage the clutch. On the other hand, the flywheel speed was too great to allow him to blank all the pieces from each strip at one pressing of the foot pedal.

The circumstances were such, therefore, as to suggest experimenting with a reduction of flywheel speed sufficient to allow the operator to complete the 5 or 6 punchings without interrupting the operation of the press.

Because the press was over-powered for the work, reducing the power capacity of the flywheel by slowing it down was of no consequence. The driving pulley of the existing belt drive

was already small and could not very well be made smaller. A lower speed motor was also out of the question because of space limitations. Consequently, the necessary reduction in flywheel speed was accomplished by cutting teeth into the flywheel face and applying power directly to the flywheel through a micarta pinion of a $5\frac{1}{2}$ to 1 reduction gear motor driven by the 1800 rpm induction motor.

This arrangement reduced the flywheel speed to the point where the operator could easily blank 5 or 6 pieces at one pressing of the foot pedal. In addition, the direct-gear drive had the further advantage that, unlike the



Micarta pinion and flywheel on machine in Reliance plant

belt drive which it replaced, no slipping could occur between the motor and flywheel when starting.

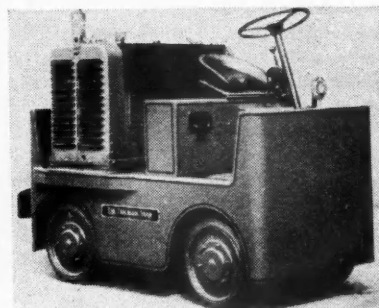
The drive is quick and functions smoothly. Likewise, by reducing the number of times the clutch is operated, much clutch wear has been eliminated and at the same time the job made less tiring for the operator.

Electric Tractor

... Four-wheel drive, four-wheel steer type designed by Mercury Mfg. Co.

A new heavy duty electric tractor of the four wheel drive, four wheel steer type has been designed by the Mercury Mfg. Co., Chicago. It develops 3500 lb. draw bar pull and has a light running speed of seven m.p.h. The design incorporates two heavy duty double reduction spiral bevel and spur geared drive axle assemblies with full floating axle shafts and tapered roller bearing mounted wheels. Wheels are fitted with 20 by 6-in. solid rubber tires and each drive is powered with a series wound vehicle type motor.

The tractor brake system is of the four wheel equalized type. External contacting shoes operate on drums



Mercury heavy-duty electric industrial tractor

mounted on intermediate gear shaft extensions on each drive axle.

The travel controller governing both motors is of the Mercury mechanical contractor type providing three speeds forward and reverse. Steering is of the four wheel type and a large diameter hand wheel controls all four wheels through a Ross cam and lever unit.

(Turn to page 286, please)

"We Want the HANCOCK Rotary DOOR LATCH ... tell us how to get it"

People Go For The Cars with this SAFETY AND CONVENIENCE FEATURE

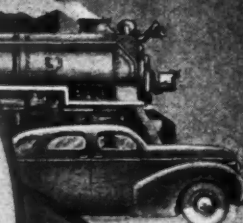
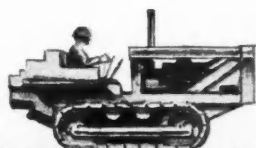
You should see the mounting stack of letters from people everywhere — asking how they can obtain this safer, more convenient door latch. It is evident that motorists don't like the hard-to-close door — that they do want the Hancock easy-to-close rotary latch.

HANCOCK Safety DOOR LATCH
HANCOCK MFG. CO. — JACKSON, MICH.

the Non-Slam Latch that Rolls Itself Shut

FEDERAL

FEDERAL BALL BEARINGS have long enjoyed a reputation for efficient performance. They are used in various industries, products and machines. High-grade steels, carefully heat-treated assure strength and stamina so essential to uninterrupted service. Made by experts in a large, modern plant where quality is considered the most important factor in the manufacture of ball bearings.



THE FEDERAL BEARINGS CO., INC.

Makers of Fine Ball Bearings

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BEARINGS

Automotive Industries

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February 25, 1939

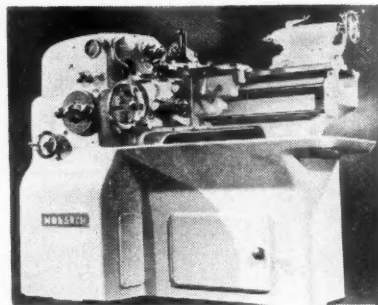
Streamlined Lathe

... Monarch introduces new 10 in. by 20 in. machine

The Monarch Machine Tool Co., of Sidney, Ohio, has introduced a new 10 in. by 20 in. sensitive precision lathe.

This Monarch development is said to have many outstanding advantages. Among them are—almost unlimited range of gearless, stepless spindle speeds—forward and reverse; wide range of threads and feeds, through enclosed quick-change gear box, which is operated by one hand; carriage held in secure alignment to the non-wearing

and ground bed ways, by five self-aligning ball bearings, which are mounted on eccentric studs; anti-friction bearings used throughout; practically automatic lubrication; three-point bearing on the floor, insuring accurate alignment; entire threading gear train, electric furnace hardened, gears with tooth contours ground, gear box operating in oil bath; neat, pleasing modernistic and practical design with a definite place for everything, and no extra levers or gadgets that might look as though they were added as "after thoughts"; chromium plated handles and hand wheels; Endless belt automatically used for all feeds from



Monarch precision lathe

spindle to gear box, reserving and preserving the accurate gear train solely for thread chasing; quick lever-clamping tool post.



Molded parts from Bay Manufacturing Company

It's PRETTY HARD to get all steamed up over a little thing like an automobile horn button. But you'll have to admit that the Durez buttons shown above are just about the smartest looking jobs that ever graced the top of a steering column!

You'll find them this year on many leading makes of cars—harmonizing happily with color schemes, giving new safety and convenience, resisting all wear and tear. And with them you'll find control knobs, interior trim, even instrument panels—all made of this modern plastic.

Because Durez is adaptable to any design—because Durez parts can be formed and finished in one operation—leading car manufacturers have standardized on this material for many molded parts. If you would like to know more about Durez, write General Plastics, Inc., 92 Walck Road, North Tonawanda, N. Y.

General Plastics'

DUREZ *Choice of the Automotive Industry*

Aluminum Ladder

... Weighs only 43 lb.; supports load of 1000 lb.

The Aluminum Ladder Co., Tarentum, Pa., recently developed a new warehouse, platform-type ladder which may be used to speed up handling and storage of products on shelves and bins. Casters on back legs make it easy to move from place to place.

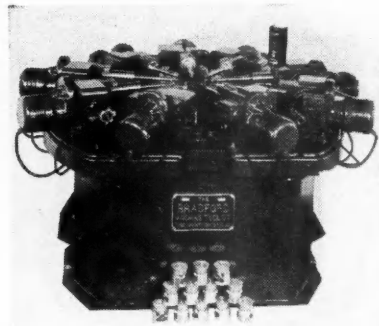
This new ladder, designated as solid-type No. 206 is made of 51 S. T. Alcoa aluminum, having a tensile strength of 48,000 lb. per sq. in. It only weighs 43 lb., yet it will easily support a load of 1000 lb. The bottom of the ladder measures 28 in. by 22 in. and the platform, 22 in. by 22 in. The platform is 66 in. from the floor.

Drilling "Smoke" Holes

... Bradford machine finishes 600 pistons per hour.

The Bradford Machine Tool Co., Cincinnati, Ohio, recently developed a machine for the drilling of closely spaced small holes such as the "smoke" holes in automotive pistons. The pistons being drilled by the machine illustrated herewith have 18 holes so spaced that it is impossible to drill them all simultaneously, therefore the machine is devised to drill 9 holes, automatically index the piston 180 deg. and then drill the remaining 9 holes.

Spindle speeds are 5100 r.p.m., and indexing time for the 180 deg. index



Bradford machine for drilling "smoke" holes in automotive pistons

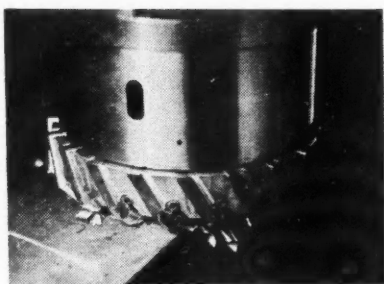
is less than $\frac{1}{2}$ sec. The machine finishes 600 pistons per hour which is equivalent to 10,800 drilled holes. This high speed of operation and synchronization required the timing of some of the synchronizing cycles to within one tenth second.

Face Mill

... Problem of chip removal handled in new way

The Ingersoll Milling Machine Co. in its new "Shear Clear" face mill has attacked the problem of chip removal in face mills in a new way. The cutting edges have been set at cutting angles so that the chip moves outwardly—away from the surface cut. This is said to eliminate any packing of chips in the face of the cutter. The finished surface is not scored by chips dragging along it.

To accomplish this cutting blades are set at negative rake and steep positive shear angles. The corner of the cutting angles is further broadly chamfered off to direct the chips outwardly. The combination of the angles and chamfer is varied to suit the work. The



Cutter on Ingersoll face mill

whole makes a very free cutting tool and in some cases a considerable increase in life between grinds has been effected. The use of the chamfer precludes the cutters from being used into sharp corners.

Collet Chuck

... Pads may be removed and new set installed in 2 minutes.

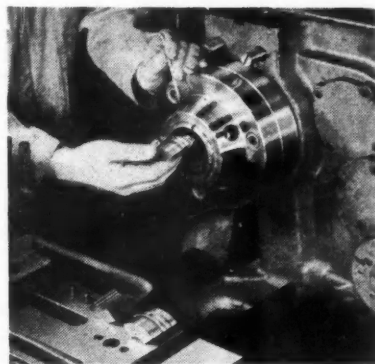
The Gisholt Machine Co. has announced new collet chucks of improved design for Nos. 3, 4 and 5 ram type universal turret lathes and 1L, 2L and 3L high production turret lathes. The chucks have capacities up to $2\frac{1}{2}$ in. diameter for the ram type machines and up to $4\frac{1}{2}$ in. diameter on the high production machines.

Removing pads from the new Gisholt collet chucks is said to take less than one-third the time formerly required and much less effort. It is only necessary to slip off the light aluminum chuck guard, after loosening a thumb screw, and take out the Allen cap screws that hold the pads in place.

The new Gisholt collet chuck is of the push-out type. It has a four-jaw master collet provided with four accurately ground collet pads which

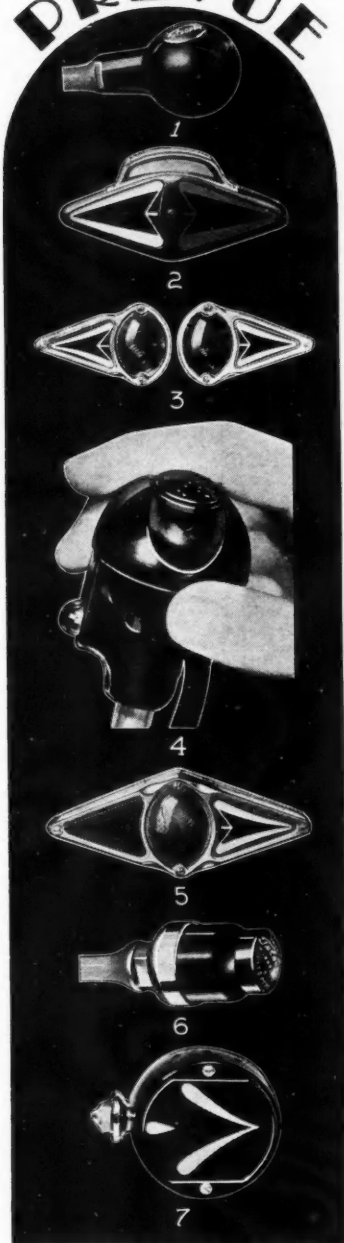
holds the bar material very accurately on center. The hardened steel collet hood is bolted and keyed directly to the American Standard A1 spindle nose. The master collet is keyed to the collet hood. Holes through the collet hood permit the removal of pad screws and the changing of collet pads without removing the collet hood from the spindle.

The collet pads are located in an accurately ground groove and held by Allen screws. Ground collet pads are furnished to fit any size or shape of bar stock such as round, square or hexagon. All collet pads are ground on the outside and round pads are ground on the inside after hardening.



Gisholt collet chuck

PREVIEW



Pre=eminent TURN SIGNAL EQUIPMENT by Teleoptic

PIONEER MANUFACTURER OF DIRECTIONAL SIGNALS

For passenger cars and trucks of tomorrow—as well as today—Teleoptic Signal equipment leads in design for safety and appearance; ease of installation; simplicity of operation; and high quality of workmanship and materials.

Laws requiring directional signals on passenger cars are now being considered; combined with public demand for additional safety, this makes Teleoptic one of the "must" items for your consideration.

Illustrated are a few of Teleoptic's latest models and other models available as standard equipment. They are:

1. **HANDI-TURN** switch for mounting in place of regular knob on latest model remote control shift levers; adjustable to suit individual driver's convenience. (A1004)
2. **LITE-MASTER**, a beautiful combination turn signal and license plate light; fits tightly against body of car and blends into lines. Visible 125 feet day and night.
3. **TWINS**, a set of matched turn signals combined with stop, tail and license light, that will enhance the beauty of any car. Visible 125 feet day and night.
4. **FINGER-FLIP** switch for conventional gear-shift levers; replaces regular knob; includes pilot light. May be mounted on steering column. (A63)
5. **DELUXE** combination stop, tail, and turn signal light; includes license plate light; ideal for small trucks and passenger cars. Visible 125 feet day and night. (A20)
6. **HANDI-TURN** switch for mounting on remote control shift levers. (A1000)
7. **COE 180** turn signal for front of car or truck. Mounts on hood of automobiles; is especially suitable for cab-over-engine trucks. Visible front, rear, and side, 125 feet day and night.

Not illustrated, but available for standard equipment, are semi-automatic, automatic, and switches that replace the horn button. We will gladly cooperate with you in solving your signal problems. Include Teleoptic equipment in your specifications. Write or wire for details.

THE TELEOPTIC CO.

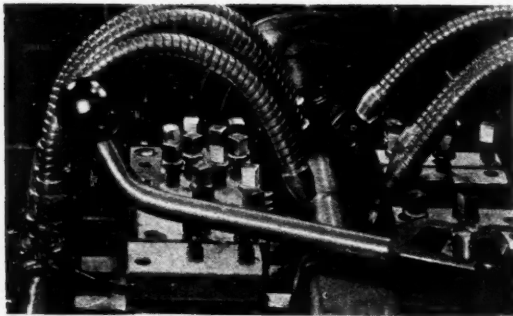
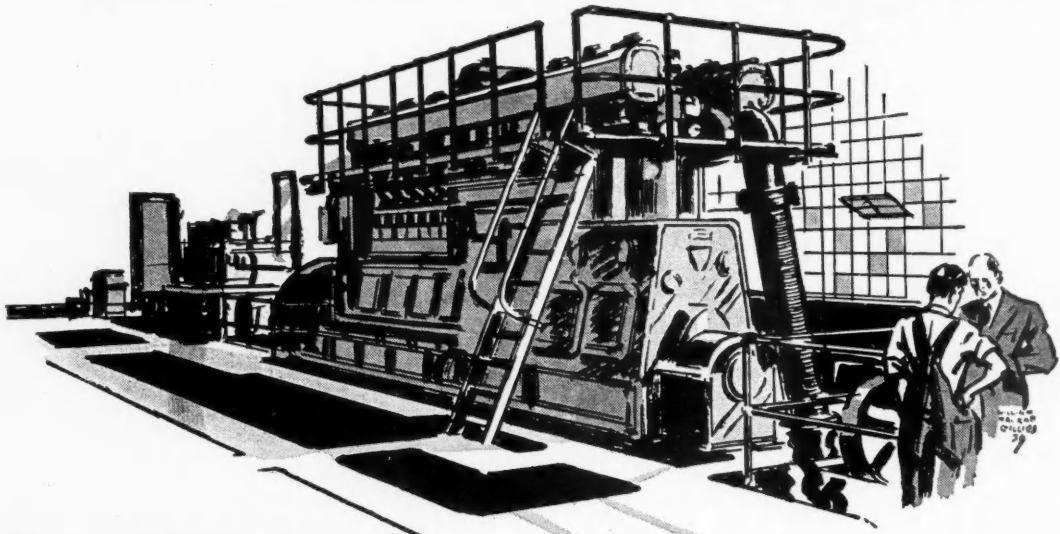
Racine,
Wisconsin

25 Years
Experience

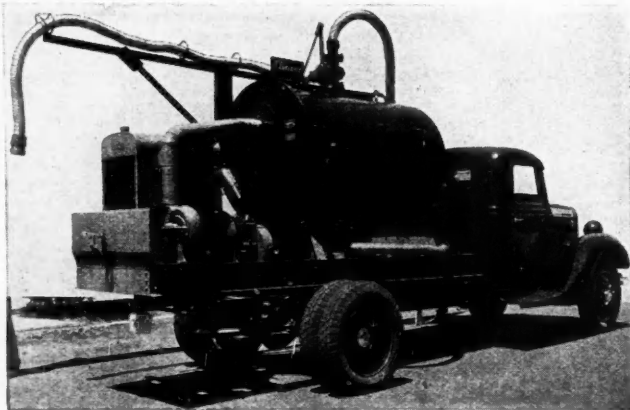
Teleoptic switches, signals, and signal equipment are protected by more than 30 patents and other patents pending. Numbers of these patents gladly given on request.

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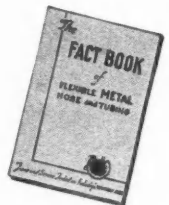
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